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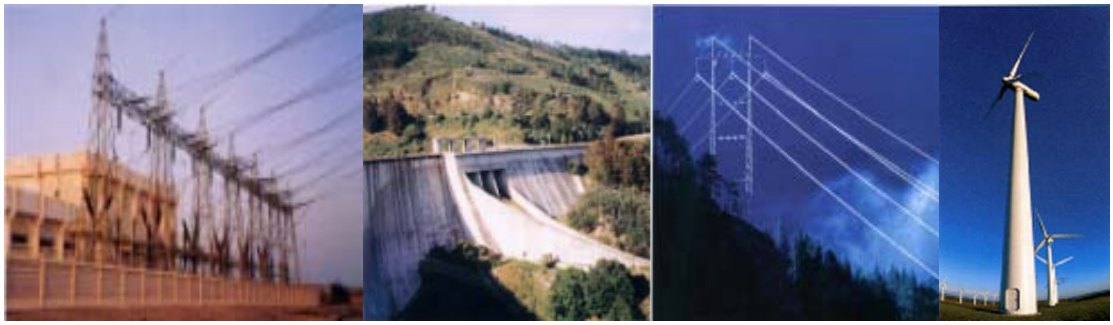

Study on Tariff Methodologies and Impact on Prices and Energy Consumption Patterns in the Energy Community

to

Energy Community

5 March 2009

IPA Energy + Water Economics

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1 EXECUTIVE SUMMARY

In August 2008 IPA Energy & Water Economics were appointed by the Energy Community to carry out a review of electricity tariffs across seven Contracting Parties of the Energy Community and four observer countries. An inception report was produced in September 2008 setting out details of our approach together with a draft of the questionnaire we proposed to gather the necessary data. This was discussed and agreed at a meeting of the ECRB Customer Working Group in Vienna on 18th September.

Responses were received back from each of the contracting parties of the Energy Community and one response was received from an observer country, namely Georgia. The data supplied in these responses formed the basis of our analysis. It should be noted that some of the respondents were unable to provide all of the data for the years covered by the survey (2005 – 2007) as in many cases the relevant components of the electricity supply chain had not been separated so relevant cost data was not available or was only provided from estimates.

1.1 Regulatory Framework

Each of the parties covered by this study now has an independent regulatory body funded by licence fees and/or levies on regulated utilities responsible for determining the allowed revenues of the regulated companies. In some cases the tariff system during the period of this study has been inherited from previous Government determined tariffs and regulators are only now determining tariff levels under the new arrangements.

Of the countries covered by our survey none had fully opened to supply competition. Where markets had partially opened it was in the non-domestic sector, but even here although competition was in theory possible, the fact that regulated tariffs are so low has meant that no-one has been willing to enter the supply market and no competition has taken place in practice

1.2 Tariff Levels

The overall average retail tariff varies considerably between the parties covered by this study, with the lowest tariffs being approximately half of the higher tariffs. Tariffs are generally increasing across the period of the study, often by quite significant amounts and it appears that those with the lowest tariffs at the start of the period are facing the greatest increases which should lead to a reduction of the differences between parties.

There are also differences in the average tariff by customer type with domestic customers generally paying less (sometimes significantly less) than commercial customers which are supplied at the same voltage levels and will have similar consumption levels.

1.3 Tariff Levels and Consumption Patterns

One part of our study was to review the relationship between changes in tariff levels and consumption patterns. Our data did not find any relationship between these two factors which is probably because over the short term other factors have a greater impact on consumption. For example in a cold spell consumption levels will increase as people need extra energy for heating even if prices are higher than they have previously been; swapping to alternative fuels (if available) is generally only viable as a longer term consideration and alternative fuels will often follow broadly similar price trends to electricity.

1.4 Cost Coverage

A review of cost coverage across the sector revealed a number of issues:

- The split of cost between cost components for transmission and distribution varies considerably from one regime to another suggesting that cost categories are not being taken into account in a consistent manner. If this is the case then it weakens some of the analysis of efficiency as some of the differences may not be due to real efficiency differences but rather due to costs being accounted for differently between nations.
- Although the general principles of applying a return on the asset base were the same across the parties, there were considerable differences to how this was applied in practice.
    - In Serbia, although a standard weighted average cost of capital was the general methodology, since the transmission company was deemed to be able to finance its activities for the plan period and it was desired to keep prices down a 0% rate was applied to transmission;
    - In Montenegro there is recognition that the applied cost of capital for both transmission and distribution is below the true cost of capital and the applied cost is being gradually increased over time to bring it up to the true cost;
    - In UNMIK the distribution and transmission system are deemed to be past their useful economic lives and have no value. The rate of return is therefore only applied to new investments since 2006.
- The principles of depreciation are again applied in a reasonably consistent manner, although UNMIK's view of the economic value of the distribution and transmission system means that only assets acquired since 2006 are being depreciated, substantially reducing depreciation levels compared to other jurisdictions

In general the regimes do not operate tariff based systems to protect vulnerable customers, where protection is provided it is through Government or social security systems. The one exception is Albania where there is a mix of tariff and non-tariff based protection, although Albania currently has an initiative under the Energy Community to move away from tariff based protection.

1.5 Efficiency Analysis

Coal and hydro power are the two main sources of electricity generation for most of the participants in this survey. For generation costs the most obvious point noted was that although hydro power offers lower unit costs than coal power, hydro generally tends to produce energy at lower levels relative to the theoretical capacity than coal. Hydro has also had much more variable output over the period we examined due to varying rainfall levels, most notably almost halving the electricity generated in Albania in 2007 causing significant problems and the need for high levels of imports.

Transmission costs were assessed against a number of cost drivers and the factor that was found to give the closest correlation with cost was length of transmission network. Against this measure Croatia and Slovenia had the highest costs relative to expected levels, while Georgia, Bosnia and Herzegovina, Serbia and UNMIK all had relatively low costs. Transmission losses were generally at the higher end of, or not very far above the levels of transmission losses seen in other European countries.

Distribution costs were also assessed against a number of cost drivers and again length was found to be one of the cost drivers. Georgia had particularly high costs on this basis with the others being relatively close to the regression line. Distribution costs per customer showed Georgia being particularly high, if Georgia was removed from the data then using number of customers as an explanatory factor gave a similarly good fit to distribution length with all the remaining countries lying reasonably close to the line.

The fact that Georgia appears to have particularly high distribution costs while being relatively low on transmission suggests that there might be some differences in the way costs are allocated between transmission and distribution in Georgia compared to other countries in this study.

Levels of distribution losses were generally quite high although they varied quite significantly. Croatia had the lowest levels, which at around 10% were in line with other European countries. Others had loss levels significantly higher with the most extreme being UNMIK (around 45%) and Albania (30% - 40%). Countries with the highest levels of losses were showing a downward trend although there is some way to go before they meet levels of other European countries. The highest levels of distribution losses were mainly the result of high levels of commercial losses, particularly the low collection rates in some countries. There is some evidence that the incentive of regulators assuming fixed levels of losses in determining distribution tariff levels is leading to reductions in those countries with particularly high losses.

2 INTRODUCTION

2.1 Background

In August 2008 IPA Energy & Water Economics were appointed by the Energy Community to carry out a review of electricity tariffs across seven Contracting Parties of the Energy Community and four observer countries. The review was to build on the previous 2006 IRG-ANRE study and extend that study to cover the following objectives:

- Understand and benchmark costs of electricity generation, transmission, distribution and supply in the Energy Community;
- Investigate the relationship between costs and prices;
- Outline tariff policies used for the protection of customers; and
- Analyse the relationship between prices and consumption patterns.

An inception report was produced in September 2008 providing more details of our proposed approach and including a draft of our proposed questionnaire to gather the required data from the participating parties. On 18th September we attended a meeting in Vienna with the ECRB Customer Working Group to discuss the inception report and draft questionnaire. Following modifications to the draft questionnaire to reflect comments received at the Working Group, the final questionnaire was sent to each participating party on 22 September 2008.

Responses were received back from each of the Contracting Parties but the only observer country to provide a response was Georgia. Our analysis therefore focussed on these parties. Slovenia also completed much of the questionnaire although they were not required to do so. The Slovenian response did not cover all of the sections of the questionnaire as they already have a fully competitive retail market and also some of the data was not so readily available for Slovenia as they operate open trading arrangements with neighbouring countries so the regulator does not have much of the data that might be required for setting retail tariffs.

Following receipt of the responses to the questionnaires, we carried out our initial analysis and arranged to visit two of the contracting parties (Serbia and FYR Macedonia) to discuss their responses in more detail. Where necessary we sent additional clarification questions to other respondents.

Some of the respondents were unable to provide all of the requested data for the period of the review (2005 – 2007). This is because in many cases the elements of the electricity supply chain were not separated during this time so there were not separate tariffs for generation, transmission, distribution and supply. This also means that the separate cost data that the regulator would have gathered to set separate tariffs was not readily available. In some cases where there is very limited data for 2005 – 2007 we have used data from 2008

2.2 This Report

This report has been structured to follow the key areas of work in the terms of reference for this project. It starts by looking at the overall regulatory regime and levels ov end-user prices. It then examines whether there is any relationship between tariff levels and consumption levels. Then it looks at the costs taken into account in setting tariff levels for each element of the electricity supply chain (Generation, Transmission, and Distribution and Supply) followed by an examination of efficiency levels for those supply chain components. The appendices provide the main points by country and also the data used in the graphs of this report.

Unless specifically indicated otherwise, where we use the terms “tariffs”, “overall tariffs” or similar terms we are referring to the overall revenues divided by the electricity consumed rather than the specific charges for energy, demand, fixed fees, etc of individual customers.

3 TARIFF AND PRICE EVOLUTION

3.1 Regulatory Regime for Electricity Tariffs

Each of the parties covered by this survey has an independent regulatory agency, funded through licence fees and/or levies on regulated utilities, which is responsible for determining the appropriate level of revenues for the electricity companies in their jurisdiction.

While in a number of the regimes the regulatory agency may not have been responsible for determined allowed revenues at the beginning of this survey (some regimes were still on tariffs set directly by government and did not have separation of generation, transmission, distribution and supply), all are now being regulated by the regulatory agency.

A summary of the funding and independence of each regulatory agency is provided below.

Albania

- Energy Regulatory Authority is an independent agency of the government that is funded through fees collected from licensees in the power sector.

Bosnia and Herzegovina

- The regulatory agencies are independent of government and are funded through license fees set on electricity companies.
- Separate regulatory agencies exist for distribution, generation and supply in Federation of Bosnia and Herzegovina and in Republika Srpska.

Croatia

- The CERA is independent of government. It is funded through a collection of one-off fees and compensations and from a levy on licensees, who are required to pay 0.06% of their total income for the previous year into the CERA's budget.

Georgia

- GNERC is independent State body, funded through regulation fees set on electricity, gas and water supply companies.

UNMIK

- ERO is an independent regulator funded through licence fees set on licensees

FYR Macedonia

- In accordance with the Energy Law, ERC is an independent authority funded through fee for issued licenses and fees based on total revenue of the companies performing energy activities in the domestic market.

Montenegro

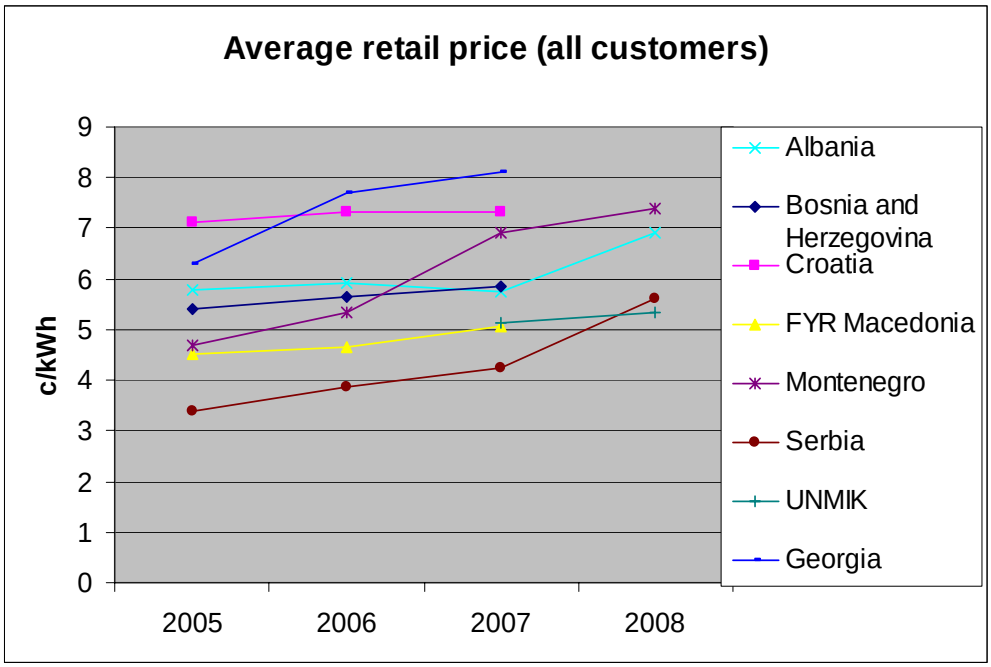
- ERA is independent of the government and is funding through license fees

Serbia

- AERS is functionally independent from other government bodies. It is funded through revenue from license fees and a part of the tariff for access to and use of the electricity transmission system. It may also receive donations (except from energy entities or persons connected with these entities)

3.2 Overall Level of End-user Prices

An initial review of the overall average retail tariff and its changes over time is shown below:



It is apparent that there is a considerable range for these tariffs, the lowest being approximately half of the highest. It is also clear that the levels of tariffs have been increasing throughout the region.

The highest overall tariffs are in Georgia and Croatia, although Croatia has seen the lowest increases (only 3% increase from 2005 to 2007) reflecting the fact that it

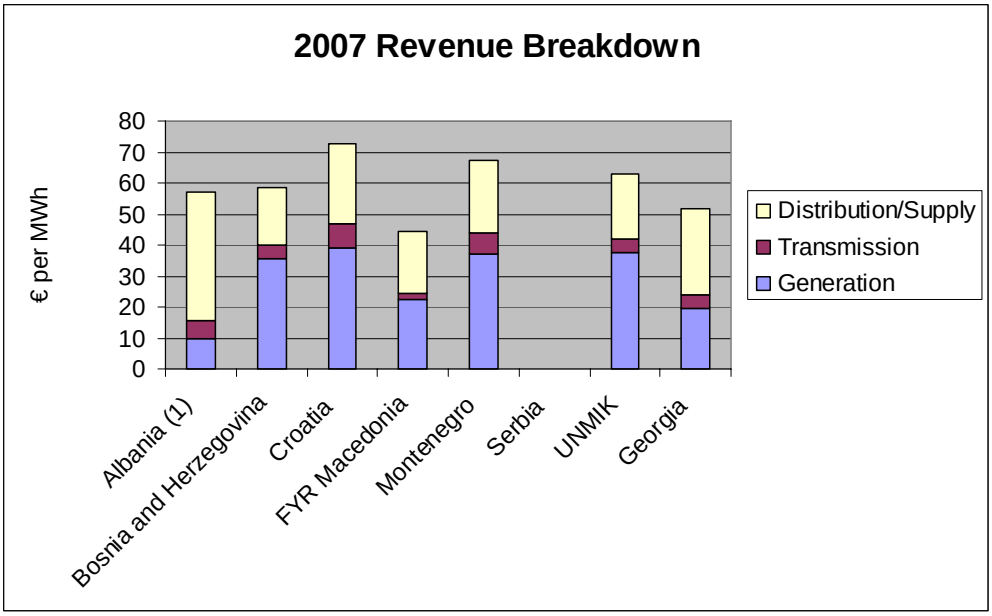
started off with the highest figures. Albania also saw relatively small increases from 2005 to 2007 but then saw a large increase from 2007 to 2008.

Serbia has the lowest average tariff, although it has seen the largest increases with a 65% increase from 2005 to 2008. Montenegro has also seen large increases with an increase of 57% over the same period.

The fact that the smallest increase in tariffs has been in the country that started off with the highest tariff and the largest increase has been in the country that started off with the lowest tariff suggests that there is some narrowing of the differences in tariffs in the region. However as the above graph shows it may be another few years before the gaps are significantly closed because all of them are showing some increases.

The above prices and movements are expressed in c/kWh for comparability between jurisdictions. Most of the currencies in the region are either fixed against the Euro or have moved relatively little against it. The largest exchange rate movement has been for Serbia, but even when expressed in local currency terms price increases in Serbia from 2005 to 2008 have been approximately 60% as opposed to 65% in Euro terms. Exchange rates are therefore accounting for very little of the price movements seen above.

3.3 End User Revenues by Supply Chain Component

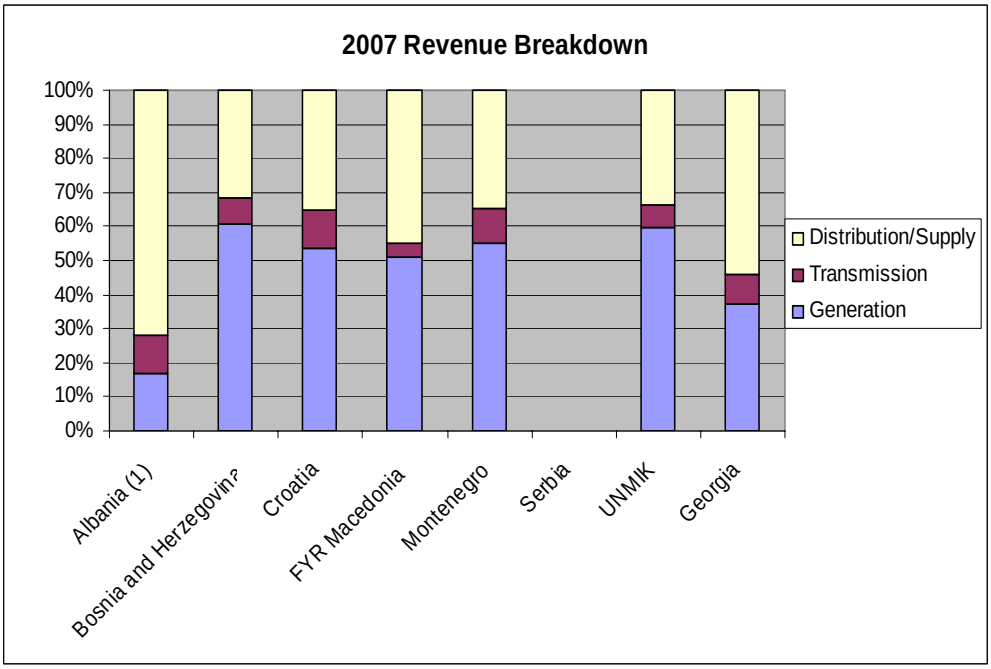


Note (1) Albania figure based on estimated as revenues were not split by supply chain component in 2007. In 2007 Albania's hydro generation had low levels of output due to low water levels and replaced the shortfall with imports; it would appear that the estimates included the costs of these imports in distribution/supply costs rather than generation costs, so distorting the mix.

The above chart shows how the overall tariff revenues from customers are broken down into the components of the supply chain. The distribution/supply components are generally consistent between jurisdictions and the transmission component, while varying, accounts for relatively little of the overall price. The main explanatory factor for variations in overall electricity prices is the generation component and as seen in section 6.1 this is largely a function of whether the country is dependent on coal (higher price) or hydro (lower price).

One point to note on the split between transmission and distribution is the slight difference between Georgia and the Contracting Parties as to where this boundary lies. While for the contracting parties any assets at 110kV and above are regarded as transmission, in Georgia some 110kV lines are regarded as transmission (the intersystem lines) and the remaining 110kV lines are regarded as distribution

The chart below presents the same data to show the proportions of the overall tariff revenues accounted for by each component of the supply chain.



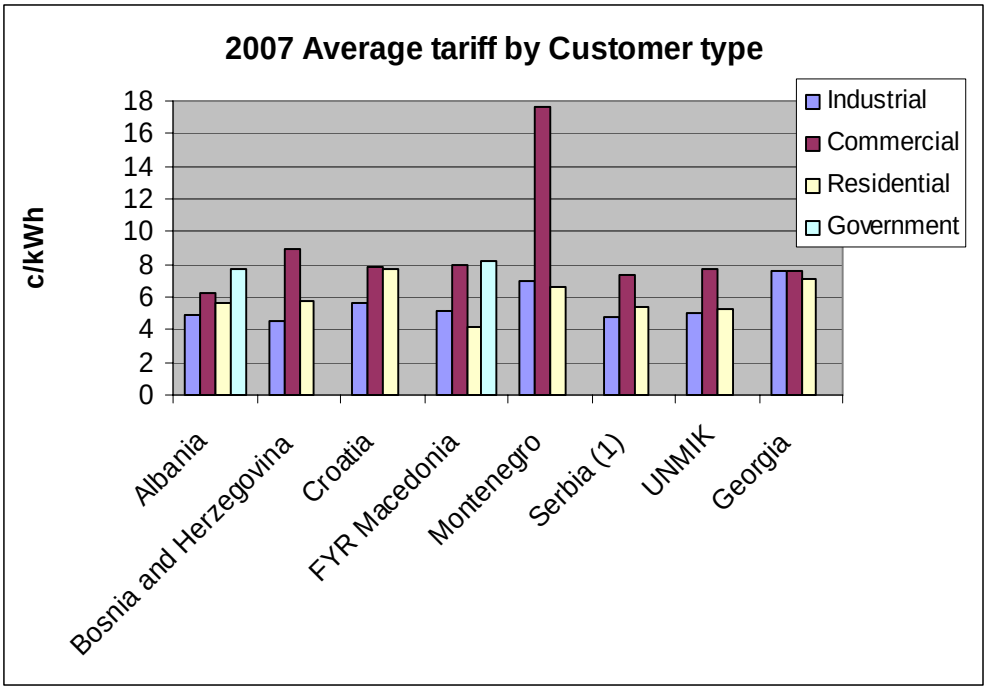
Note (1) Albania figure based on estimated as revenues were not split by supply chain component in 2007

3.4 Prices by Consumer Type

Information on average tariffs was also provided by the following different customer types:

- Industrial – customers connected at voltages above 400v including both those connected at distribution and transmission levels;
- Commercial – non residential customers connected at 400v or below;
- Residential – households rather than commercial or business customers; and
- Government – if there are special tariffs for supplying government customers.

The split by these categories for 2007 is shown below:



Note (1) For Serbia 2008 values have been used as no tariff data for these categories was available for 2007

Only two countries have tariffs for Government customers, Albania and FYR Macedonia. In both these cases the average tariff paid by Government customers is higher than tariffs for other categories of customer.

There are significant differences between tariffs for different customer types across most regimes. Commercial customers generally pay more than other customers, especially so in Montenegro where the average commercial tariff is particularly high. One would expect industrial customers to be paying less per kWh than commercial customers, as they are connected at higher voltages and so use less of the distribution network. Also the quantities of electricity used will be significantly higher so the cost per kWh should be lower.

The high level of commercial tariffs relative to residential tariffs in Montenegro is an inherited issue where there was deliberate cross-subsidisation of residential customers in order to maintain low prices for them. The Montenegrin regulator is aware on this difference and is gradually reducing the gap with the aim of bringing the tariffs to similar levels.

FYR Macedonia is the country where residential customers are paying less than any other category of consumer and only half the level of commercial customers despite the fact that many commercial customers are connected at the same voltage levels and in many cases will have consumption levels similar to residential consumers. The Energy Regulatory Commission of Macedonia is currently reviewing tariffs and is aware that the difference in tariffs between residential and commercial consumers is not justified on cost grounds. However any rebalancing is likely to lead to significant increases in residential tariffs which will not be politically popular.

Residential customers are also paying significantly less than commercial customers in Bosnia and Herzegovina, Montenegro, Serbia and UNMIK.

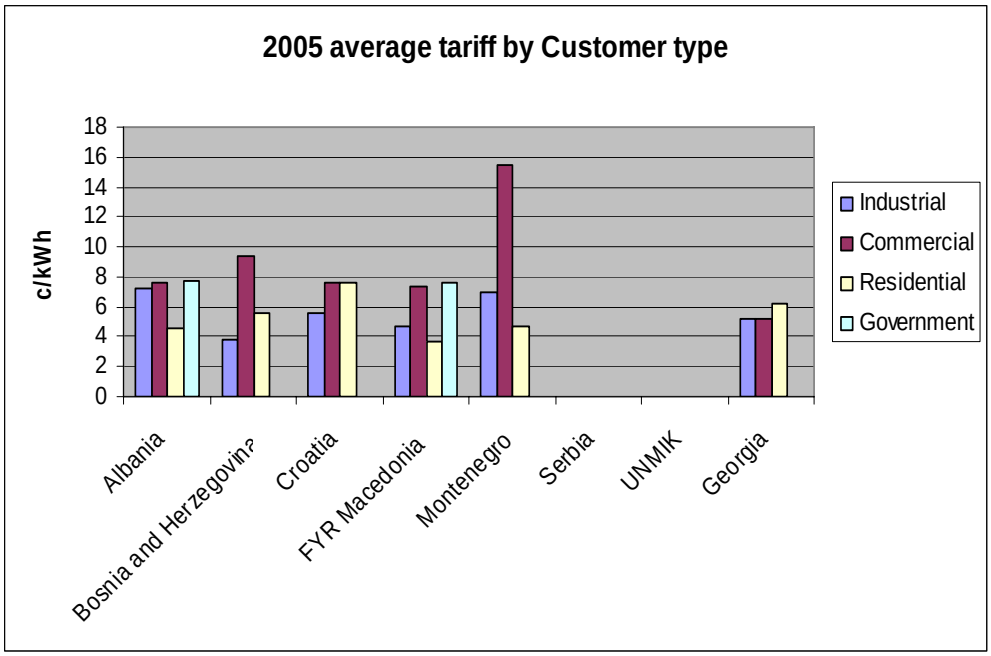
Georgia is the country where average tariffs, expressed in c/kWh, are most similar across customer types.

In Montenegro there are specific tariffs for certain specific types of customer with the following average values in 2007 compared to an average value for industrial customers of 6.99c/kWh;

- Aluminium plant electrolysis: 2.88c/kWh
- Steel industry: 6.01c/kWh
- Railway transportation 5.98c/kWh

The value of the tariff for aluminium electrolysis is most striking showing a clear support for this industry through the tariff levels. The aluminium plant is a major employer in Montenegro, both directly and indirectly, and represents a significant part of the country's overall GDP.

If one also looks at the average tariff by customer type (see below) one sees a broadly similar pattern suggesting that in general there has been little change to the arrangements for charging different customer types over the period



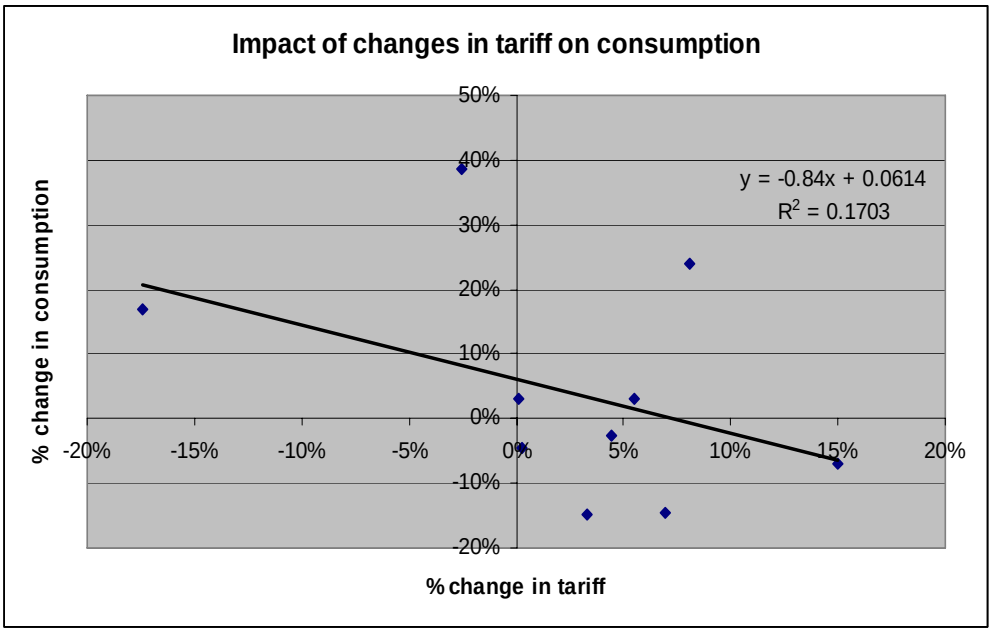
For Albania and Montenegro residential customer tariffs relative to other classes of customers were lower in 2005 than 2007 which would suggest that in these two countries there has been some movement towards rebalancing the tariffs to reflect the relative costs of different sectors

4 RELATIONSHIP BETWEEN TARIFFS AND CONSUMPTION

Basic economic theory would suggest that as the price for a commodity such as electricity increases, the demand should fall. A concern in the region covered by the Energy Community might be about the impact on demand as electricity tariffs move from low levels that they have historically been to more cost reflective tariffs that will be required going forward.. This review asked us to consider the relationship between tariffs and consumption.

4.1 Assessment of Relationship

To consider this relationship between average residential tariffs and residential demand, we plotted data of the annual percentage change in consumption levels against the annual percentage change in average tariffs:



Even a cursory review of the points on this chart show that for the parties covered by this survey over the period 2005 – 2007 there does not appear to be any relationship between the tariff levels and demand. If one plots the regression line, it shows the downward trend one would expect, but the very low r^2 confirms that very little of the changes in consumption levels seen can be explained by changes in tariff levels.

Since the affordability of electricity is more likely to impact demand than the absolute level of prices, we adjusted the tariffs using average family incomes to see if there might be any improvement in the relationship. However even with this adjustment one finds that very little of the change in consumption levels can be explained by changes in tariff levels

A number of other factors can have a greater impact on consumption than changes in prices. One key example would be the weather; during a particularly cold period demand will increase for heating whatever the level of prices, conversely during a

milder period demand will drop regardless of the fact that electricity prices may be relatively cheap.

Furthermore it is not particularly easy or cheap for consumers to switch fuel sources as this can involve the requirement for substantial purchases of new equipment (eg new gas boilers or cookers) as well as the costs of connecting to the new supply. Indeed in areas where there is no gas network there may be few other practical alternatives to electricity for domestic heating and cooking.

Unless consumers are confident that any price differentials are going to remain for the foreseeable future, and are confident that availability of the alternative will be secure, there will be a reluctance to change. If regulators are clearer about future price trends (accepting the uncertainty in the underlying fuel costs) this may lead to better informed consumers feeling more confident about fuel choices.

Another factor that would have a significant impact on demand is the closure or significant change in output of larger industrial consumers. The closure or change in output may well be for a number of reasons other than electricity prices, but it will nevertheless lead to changes in demand for electricity.

4.2 Conclusion on Tariffs and Consumption

While long term (or with very large tariff changes) one would expect to find a relationship between tariff levels and consumption, in the jurisdictions under review there are clearly other much more important factors affecting consumption levels in the period under review. The data available does not demonstrate any meaningful relationship between tariff levels and consumption.

5 DEVELOPMENT OF COMPETITION

5.1 Supply Competition

Of the countries covered by this survey none had fully opened up to supply competition during the period covered by the survey (2005 – 2007). Croatia fully opened to competition in 2008 while Albania and Bosnia and Herzegovina opened up to supply competition for non households during 2008. The other countries have not yet opened up to supply competition.

All countries state that there are no restrictions on who may enter the market other than the requirements that exist for everyone to obtain the relevant licence.

Despite this, where countries have opened up to competition there have been no new entrants and the incumbent has retained 100% market share. This is because the regulated retail tariffs are below levels at which new entrants would be able to enter the market to compete effectively and have even been stated as being below the wholesale energy price which a new supplier would have to buy energy at.

A further factor inhibiting supply competition is the fact that supply has not yet been unbundled from distribution. While the incumbent distribution network is able to carry out supply activities and is not required to clearly separate those activities from distribution, any new entrant in the supply market is unlikely to have confidence that they are being treated on an equal basis with the distributor's own supply business

In contrast in Slovenia where the market is fully open to competition there are five different suppliers with market shares of greater than 10% and no more regulated retail tariffs.

Until the issues of low regulated retail tariffs and unbundling of supply from distribution are dealt with it is hard to see how effective competition in supply will develop.

Summaries of the position of each country towards opening up supply are given below.

Albania

- In 2005 two industrial customers switched supplier but one switched back to tariff supply in 2006 so only one customer (representing 2-3% of total demand) is not with the incumbent supplier.
- From 2008 all non-households are free to switch supplier.
- There are no restrictions on who may apply for a supplier licence

Bosnia and Herzegovina

- Retail competition has existed in principle from 2005. All customers except households are able to change supplier since 1 January 2008. Retail market for households will open from 2015.

- In practice there has been no real competition in supply because end user regulated tariffs are lower than wholesale energy prices.
- Formally no restrictions on new suppliers, but dominance of incumbent and regulated end user tariff being lower than wholesale energy prices means there have been no new entrants.

Croatia

- Retail market fully opened to competition from 1 July 2008. No customers have actually changed supplier.
- There are no restrictions on suppliers that may enter the market.

FYR Macedonia

- Retail market will start to open from 1 January 2010, initially for industrial consumers connected at 35kV and 10kV and will be open for households from 1 January 2015.

Montenegro

- No competitive retail market yet in Montenegro

Serbia

- No competitive retail market yet in Serbia

UNMIK

- No competitive retail market in UNMIK

Georgia

- Customers able to buy electricity directly from generators up to 13MW.
- Separate suppliers don't exist – distribution companies are the suppliers

Slovenia

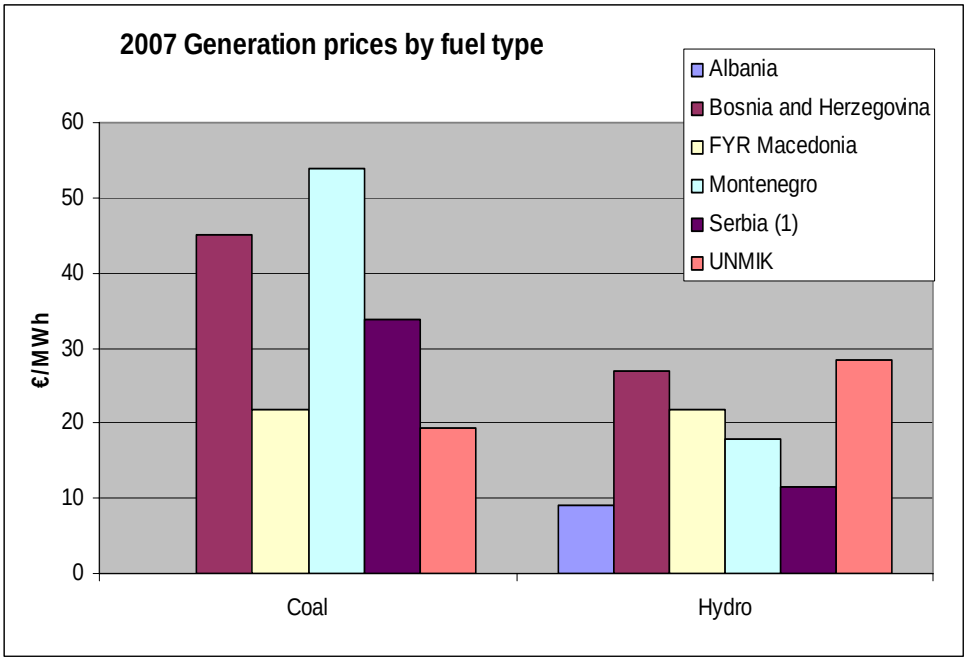
- Retail market already fully open to competition. Five different suppliers with market shares of 10% or more in 2007. No regulated retail tariffs.

6 COST COVERAGE AND CROSS SUBSIDIES

Full coverage of costs is an important feature of any sector that wishes to encourage competition and new investment. Competition and new investment are both necessary throughout the Energy Community area to increase efficiency and to meet the growing infrastructure demands in the area.

We have therefore reviewed the tariffs for each sector within the electricity supply chain with a view to determining the degree to which those tariffs cover all the relevant costs.

6.1 Generation Cost Levels



Note (1) for Serbia 2008 data used as 2007 data not available

The above chart shows the generation prices for the two dominant sources of generation (coal and hydro) in 2007. As expected, although there is some variation, the price associated with hydro is generally lower than the price with coal. Generation prices for other fuel types have been omitted as they represent a relatively small part of the overall generation and the prices vary widely which would distort the graph.

6.2 Generation Cost Coverage

Respondents to the questionnaire were asked to describe whether each of the following cost types were taken into account in determining regulated generation tariffs:

- Fuel;
- Waste disposal;
- Other operating costs;

- Depreciation;
- Rate of return; and
- Decommissioning.

Responses were consistent from each of the respondents. However as the questionnaire did not require values for each of these components, it may be possible that the value included for each component varies significantly from one respondent to another, in the same way that the Transmission and Distribution sections below show that although respondents include the same cost types within their tariffs, there is considerable variation in the values included.

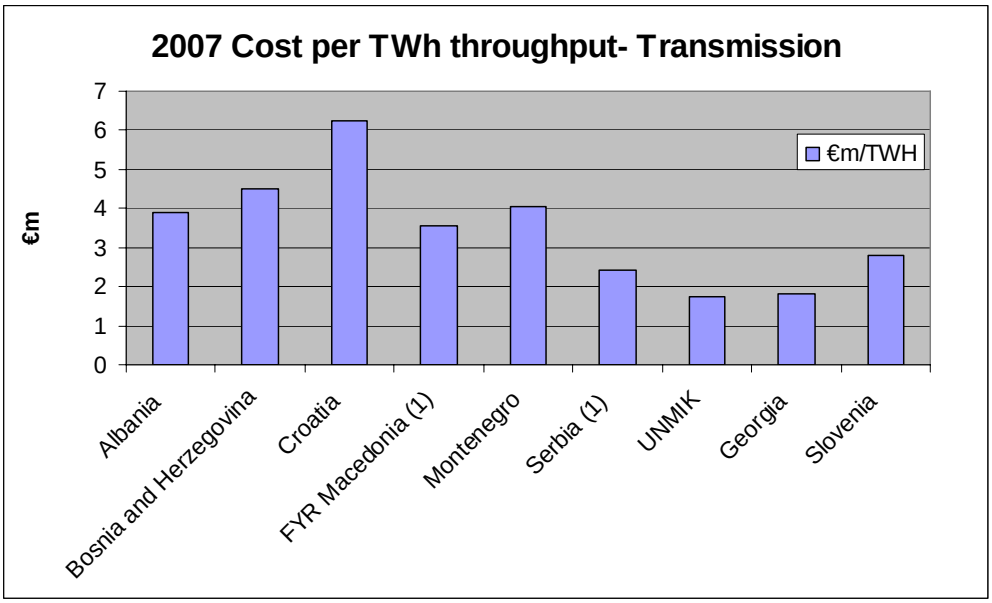
Fuel costs were taken into account in the tariff methodologies for generation, although this is not applicable in the case of hydro generation which forms a significant part of the generation capacity for some of the respondents and almost all of the generation capacity for Albania.

Waste disposal costs were not specifically taken into account by any of the respondents. Some respondents stated that such costs would either be regarded as part of the fuel cost or the costs would be included in the operating costs category.

Other operating costs were part of the assessment of regulated generation tariffs for all respondents.

Rate of return was part of the assessment of regulated generation tariffs for all respondents. However, as with rate of return for transmission tariffs, the rate of return used may not reflect the full cost of capital of generation because of the assumption that Government as shareholder may prefer to keep prices down than obtain a full return on its equity, or because of the ability to access debt on cheap terms either from the government or international organisations.

6.3 Transmission Tariff Levels



The average levels of transmission tariffs per unit of energy transported on the transmission network for 2007 are illustrated above. As can be seen there is considerable variation with the lowest figure being only a third of the highest.

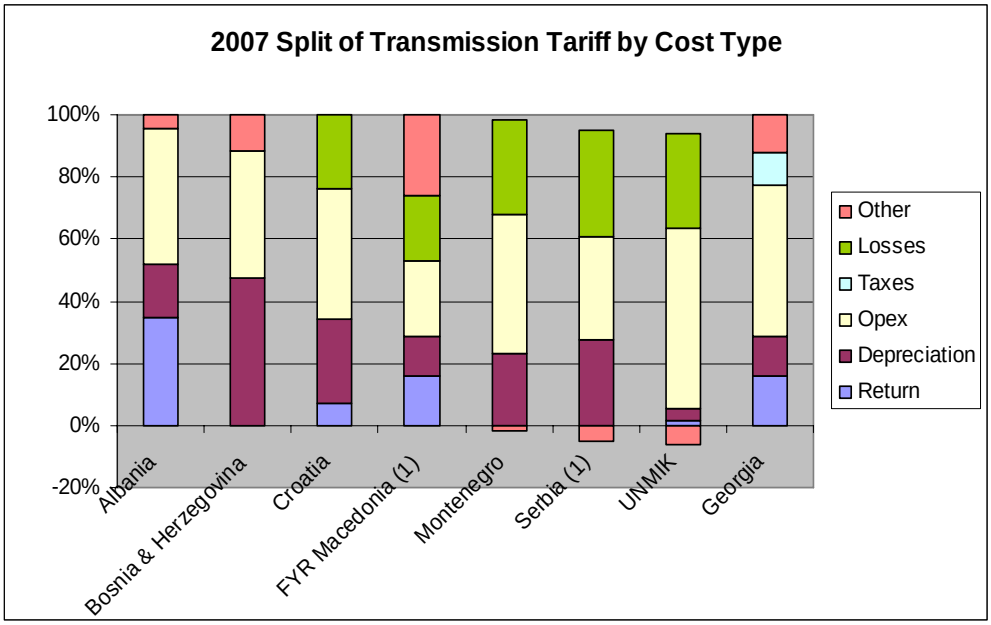
Some of the factors explaining these differences are explored below.

6.4 Transmission Cost coverage

To assess the degree to which transmission costs were being covered by revenues, respondents were asked to break down those revenues into the following categories:

- Return on capital;
- Depreciation;
- Operating costs (opex);
- Taxes;
- Transmission Losses; and
- Other.

The results of this breakdown (expressed as a percentage of distribution revenues) is shown in the following chart



Note (1): For FYR Macedonia and for Serbia data was not available for the split of transmission tariff by type of cost for 2007 so data from 2008 has been used instead.

As with costs included in the distribution tariff (see below), the degree of variation in the cost components of the transmission tariff is striking. While some degree of variation from one regime to another is to be expected, the degree of variation in some of the costs suggests that those cost categories are not being taken into account in a consistent manner between the different countries covered by this survey.

Transmission losses were not included in the transmission tariff for Albania or Bosnia and Herzegovina for 2007, although revised market rules mean that transmission losses are included in Albania's transmission tariff from 2008. Where transmission losses are being included in the transmission tariffs these are a broadly similar proportion of the total (which one would expect with fairly similar levels of losses as a percentage of energy put onto the system) with the exception of Georgia where for some reason transmission losses represent a very small proportion of the transmission tariff.

The return on asset base is one element that shows the greatest variation as a proportion of the transmission tariff. For some no return has been included within the transmission tariff whereas for Albania it represents over 30% of the tariff. Differences in the rate of return for transmission are discussed further below.

The "other" component is mainly a mixture of other revenues (eg capacity auction revenues) and the cost of purchasing ancillary services where these costs are included in the transmission tariff.

6.4.1 Return on Asset Base

In 2005 only Georgia was including a return on asset base within the transmission tariff or has data breaking the transmission tariff down into such components. By 2007 the number of jurisdictions that had this analysis and were including a return on asset base had increased to 4: Albania, Croatia, UNMIK and Georgia. FYR Macedonia and Montenegro only included an element for return in their transmission tariffs from 2008.

In a number of cases, even where an element is being included for the return on assets it is acknowledged that this is not the full cost of capital or that there is only a gradual process of moving towards the full cost of capital.

- In the case of Serbia, although there is a methodology for assessing the cost of capital, no return is allowed in the regulated revenues as the regulator has assessed that the TSO has sufficient financial resources without being allowed a return.
- For UNMIK the return is only applied to new investments since 2006. The remainder of the transmission system is deemed to be past its economic life and to have no economic value to apply the rate of return to.
- In Montenegro the applied rates of return are acknowledged to be below the true cost of capital. Applied rates are being gradually increased towards the cost of capital rather than increasing it all at once.

Summaries of the treatment of rate of return for each jurisdiction are provided below.

Albania

- For 2006 and 2007 return was set at Government bond rates of 7-8%

- For 2008 a CAPM model was used with a Return on Equity of 0%, Return on Debt of 3% (soft terms of debt due to guarantee from Government), and a balance sheet gearing of 89%

Bosnia and Herzegovina

- No return on asset base included in transmission tariff for the years 2005 – 2007.

Croatia

- No details of breakdown of transmission tariff for the years 2005 – 2007. Tariff system entered into force from July 2008.using a CAPM approach to determining cost of capital

FYR Macedonia

- No separate regulated transmission tariff for 2005 – 2007.
- Regulated revenues first set for transmission in 2008 using a weighted average cost of capital and CAPM approach (Cost of equity 8.56%, Cost of Debt 5.4% and WACC 6.91%)

Montenegro

- No separate regulated transmission tariff for 2005 – 2007.
- Rate of return set at 2.5% for 2008 and 4.0% for 2009. This is acknowledged to be below the real rate of return, but there is a process to gradually increase the allowed return to one determined with a CAPM approach.

Serbia

- No separate regulated transmission tariff for 2005 – 2007.
- A weighted average cost of capital is the approach for determining return on regulatory assets, but for 2008 the regulatory agency estimated that TSO would have enough financial resources from depreciation to cover all their needs for investments so did not approve any rate of return (ie rate of return set at 0).

UNMIK

- Return on asset base included in transmission revenues from 2007.
- Since the transmission system is considered old and past its economic life, the return is only applied to new assets invested in since 2006.
- For 2007 cost of debt 7.9%, Weighted Average Cost of Capital 10.8%

Georgia

- Transmission tariffs have included an element for return on asset base for each of the years 2005 – 2007.
- Return is determined using WACC and CAPM models.

Slovenia

- Values of rate of return are based on CAPM and specified in the regulatory framework as 2005 5.1%, 2006 4.13%, 2007 4.13%.

6.4.2 Depreciation

In general depreciation is accounted for on a consistent basis and is calculated to write off the book values of the assets over their economic lives. We have not reviewed the average asset lives used, which in any case may differ because of different types of asset. In some cases depreciation rates may be determined by legislation and/or local tax regulations, but even in these cases the principle would be to recover the asset cost over its economic life.

The one country where the level of depreciation is noticeably different despite following the same basic principles is UNMIK. Here the existing assets are deemed to be past their economic lives and so there is no value to depreciate; only new assets acquired since 2006 generate any depreciation to be included in the determination of regulated revenues. As new investment in the system takes place, both the asset value and the rate of return will gradually increase, pushing up the average tariff.

Summaries of the approach to depreciation for each country are set out below.

Albania

- Regulator applies tax lives of assets to determine depreciation for regulatory purposes. May decide on some other approach in specific circumstances, eg in cases of asset revaluations.

Bosnia and Herzegovina

- Depreciation is calculated on the basis of the assets life.

Croatia

- Depreciation is calculated using straight line method.

FYR Macedonia

- Assets are depreciated on a straight line method using rates set in accordance with primary and secondary legislation.

Montenegro

- Depreciation calculated over different periods depending on asset type. Straight line method is used.

Serbia

- Assets depreciated over their lives using straight line method

UNMIK

- Depreciation calculated on a straight line basis using a weighted average asset life.
- Since the transmission system is considered to be old and past its economic life, depreciation is only allowed on new assets invested since 2006.

Georgia

- Straight line or reducing balance.

Slovenia

- Straight line depreciation over the asset life

6.4.3 Transmission Losses

As the split of transmission revenues above shows, a number of regimes did not include transmission losses as part of the costs to be covered by transmission revenues during 2007, in a number of cases because there was not a separate regulated transmission tariff at this time. However by 2008 separate transmission tariffs had been established and the cost of transmission losses included in determining that tariff.

The level of transmission losses included in revenue determination is based on an assumed level by the regulatory agency so that the transmission company is incentivised to reduce losses below this level to increase the profits it makes.

As shown in section 8.2, the level of transmission losses are generally considered acceptable and are not too dissimilar to levels in other parts of Europe.

Details of the inclusion of transmission losses for each regime are set out below.

Albania

- Losses included in transmission tariff from 2008, but not in 2006 or 2007
- Price cap regulation recently introduced and is considered to give incentive to reduce costs.

Bosnia and Herzegovina

- No transmission losses included in transmission tariffs from 2005 – 2007
- Transmission losses are on a level considered acceptable.

Croatia

- No separate regulated transmission tariff for years 2005 – 2007. Transmission tariff methodology allows for costs of losses on the network to be included as part of operating costs.

FYR Macedonia

- No separate regulated transmission tariff for years 2005 – 2007. Transmission losses included in determining regulated revenue for 2008.
- Rulebook for determining transmission revenues recognises losses up to 3%. For the period 2005 – 2008 transmission has achieved lower levels than this due to new investments.

Montenegro

- Transmission losses included in determination of transmission regulated revenue from 2007. No separate regulated revenue for transmission before that.
- Transmission loss costs are set for the revenue approval period. If the company can reduce losses below this level it will gain.

Serbia

- No separate regulated transmission tariff for 2005 – 2007. Transmission losses included within transmission revenues for 2008.
- No specific incentives to reduce transmission losses.

UNMIK

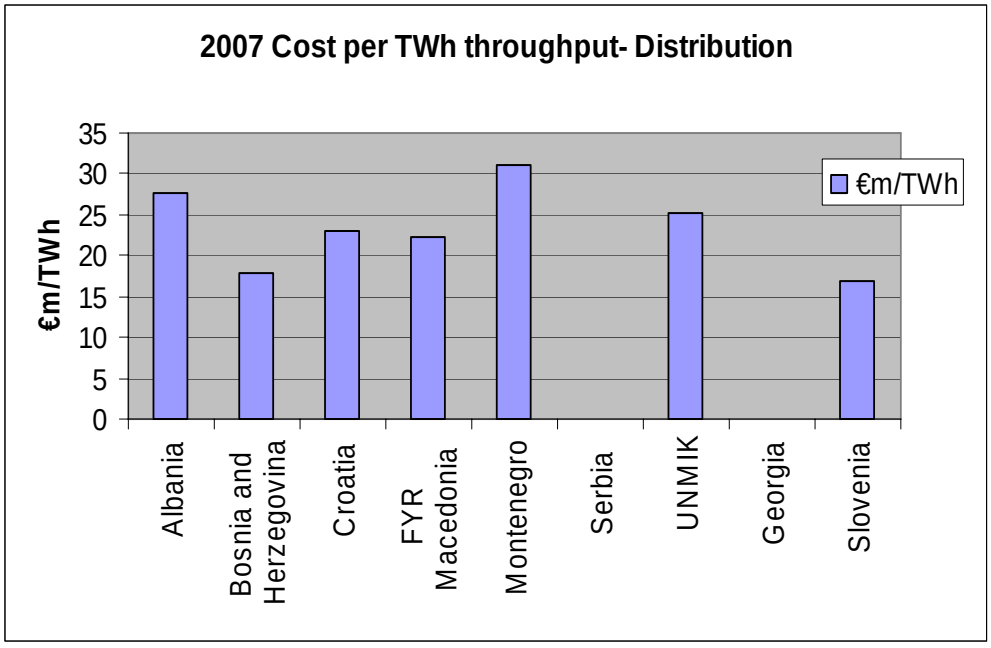
- Transmission losses included in transmission regulated revenues from 2007. No separate regulated transmission revenues before that.

- Transmission loss costs are set at a previously determined level of losses. If losses differ from this the transmission company will wither make a loss or gain.

Georgia

- Transmission Losses included in regulated revenues.
- Losses are incentivised by setting a normative level of losses for determining transmission revenues. If actual losses are then greater than this the transmission company bears the excess cost.

6.5 Distribution Tariff Levels



The average levels of distribution tariffs per unit of energy delivered on the distribution network for 2007 are illustrated above. As can be seen there is considerable variation with the lowest figure of the countries covered by this review being almost 30% less than the highest. Slovenia is even lower still being almost 50% below the highest of the countries covered by this review

Some of the factors explaining these differences are explored below.

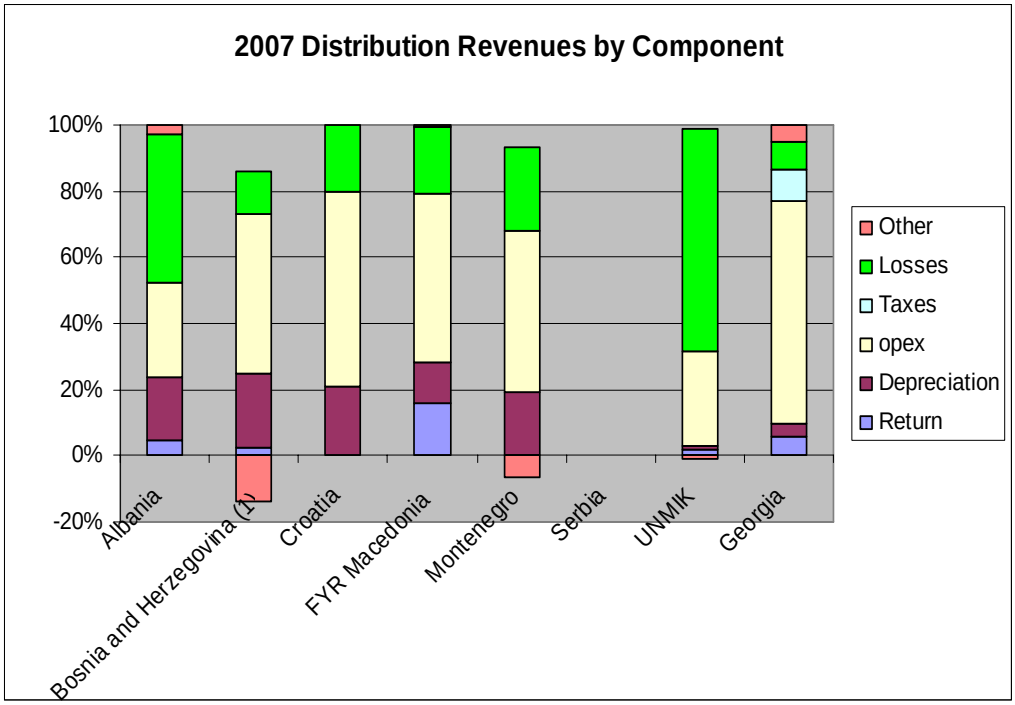
6.6 Distribution Cost Coverage

To assess the degree to which distribution costs were being covered by revenues, respondents were asked to break down those revenues into the following categories:

- Return on capital;
- Depreciation;

- Operating costs;
- Taxes;
- Distribution Losses; and
- Other.

The results of this breakdown (expressed as a percentage of distribution revenues) is shown in the following chart:



Note (1): For Bosnia and Herzegovina the data relates only to Republika Srpska as no data was provided for Federation of Bosnia and Herzegovina.

Data was not available for Serbia as tariffs have not yet been determined for distribution in accordance with the new methodology.

While it is clear that in general operating costs are the largest component (as one might expect) and that distribution losses and depreciation are also significant elements, it is also striking how much variation there is between each of the jurisdictions. While some degree of variation from one regime to another is inevitable, the degree of variation shown above suggests that these cost categories are not being taken into account in a consistent manner in the countries covered by this survey.

For Albania and especially for UNMIK, distribution losses account for the largest single component of the tariffs. For others, distribution losses, while still significant, represent a much lower proportion of the tariff make-up.

The capital elements of the distribution tariff are particularly low for UNMIK. This is because most of the distribution system in UNMIK is deemed to be old and past its economic life. Depreciation and rate of return are therefore only allowed on new asset investments since 2006. The other regimes generally take the value of assets from the accounting records of distribution companies (including

revaluations if approved by the regulator) as the basis on which to determine allowances for depreciation and the rate of return.

Although a relatively small proportion of the overall figure, the return element shows considerable variation between responses. This varies from zero for Montenegro (although a return element is included for 2008 and subsequent years in Montenegro) to the highest proportion of distribution revenues in FYR Macedonia. However even in FYR Macedonia the return is less than it would be for a similar independent business as most of FYR Macedonia's Distribution funding is through Government equity and the debt it has benefits from loans on preferential terms from international organisations. The return provided for distribution is discussed in more detail below.

One other feature of the above breakdown of Distribution revenues is the "other" category. For Albania and Georgia these are additional cost items (financial expenses in the case of Albania). For Bosnia and Herzegovina and Montenegro the "other" item is a negative amount representing other revenues received by Distribution.

6.6.1 Return on Asset Base

The principles for applying the return on asset base within the distribution tariffs are similar to those for transmission discussed above. However a number of differences exist in the application due either to different timings of determining distribution tariffs or to slightly different figures used for the rate of return.

In 2005 only FYR Macedonia and Georgia were including a return on asset base within the distribution tariff or has data breaking the distribution tariff down into such components. By 2007 the number of jurisdictions that had this analysis and were including a return on asset base had increased to 5: Albania, Bosnia and Herzegovina, FYR Macedonia, UNMIK and Georgia. Croatia and Montenegro only included an element for return in their distribution tariffs from 2008. Serbia was still applying old tariffs to distribution up to 2008 and is only currently in the process of determining distribution tariffs under its new methodology

In a number of cases, even where an element is being included for the return on assets it is acknowledged that this is not the full cost of capital or that there is only a gradual process of moving towards the full cost of capital.

- For UNMIK the return is only applied to new investments since 2006. The remainder of the distribution system is deemed to be past its economic life and to have no economic value to apply the rate of return to.
- In Montenegro the applied rates of return are acknowledged to be below the true cost of capital. Applied rates are being gradually increased towards the cost of capital rather than increasing it all at once.

Summaries of the treatment of the distribution rate of return for each jurisdiction are provided below.

Albania

- For 2006 – 2007 no separate distribution tariff existed therefore no assumptions about rate of return for distribution were applicable.
- For 2008 a CAPM model was used with return on equity of 0% (Government owner not require any return), return on debt 3.6% (soft terms due to government guarantee) and a balance sheet gearing of 37%

Bosnia and Herzegovina

- B&H has two separate distribution regulators for regulating distribution in the Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS).
- For the first tariff period (2006 – 2007) in Republika Srpska the return on equity was determined to be 4.5% and the return on debt 5%. For the second tariff period from January 2008 return on equity was 3% and return on debt 7%

Croatia

- Croatia uses a WACC model and for 2008 the rate of return for distribution is 4.6%

FYR Macedonia

- FYR Macedonia uses a WACC model with a WACC of 9.48% for 2005 and 9.02% for 2006 and 2007. The reduction in WACC primarily occurred because the cost of equity fell from 9.5% in 2005 to 9.1% in 2006 and 2007. Gearing is very low hence WACC is very similar to cost of equity
- The cost of debt used for distribution in FYR Macedonia is less than the risk free rate. This reflects the fact that (as with transmission) substantial parts of the debt are loans from international organisations (particularly the EU) on preferential terms. The actual cost of borrowings that the distribution business incurs are therefore lower than the risk free rate in the FYR Macedonian market.

Montenegro

- A rate of return has only been included in distribution tariff calculations from 2008. For 2008 the rate used was 2.5% and for 2009 the rate is 4.0%.
- The Montenegrin regulator recognises that this rate of return is below the true cost of capital and is gradually increasing the rate to apply a CAPM methodology although the full rate has not yet been achieved.

Serbia

- The regulatory agency has adopted the methodology for setting distribution tariffs which has been approved by the government, but this has not yet been applied to determine distribution tariffs. Currently therefore, there is no data on distribution tariff rates of return available for Serbia.

UNMIK

- UNMIK uses a CAPM and WACC approach for distribution cost of capital and has a return for distribution of 10.8%
- Since the distribution system is considered old and past its economic life, the return is only applied to new assets invested in since 2006

Georgia

- Georgia uses a CAPM approach to determining rate of return for distribution. The rate determined is different for each company.

6.6.2 Depreciation

Depreciation methods and calculations for distribution are on the same basis as those for transmission. The variations in the levels of depreciation within the overall distribution tariff largely reflect differences in the asset base which is being depreciated. Generally regulators use the book value of the assets from the accounts of the distribution companies, and in most cases include revaluations. The main exception to this is UNMIK where the distribution network is deemed to be old and past its economic life so depreciation (like rate of return) is only allowed on new assets since 2006. This explains why the depreciation component of distribution tariff revenues for UNMIK is so much lower than for the others.

6.6.3 Distribution Losses

For most of the regimes the cost of distribution losses represents a significant part of the regulated distribution revenues. For Albania and UNMIK it is the largest single element in the breakdown of revenues that was provided for this survey.

The approach to incentivising distribution losses is consistent across the region. The regulator will assume some pre-determined level of losses which is used for the basis of determining regulated revenues. Where actual losses differ from this, the additional cost or saving remains with the distribution company giving them an incentive to reduce losses and thus increase profits.

In FYR Macedonia the approved level of losses is set at the level of technical losses, no allowance is given for commercial losses despite the fact that these are still significant, but falling.

In Montenegro the level of losses approved by the regulator is gradually reducing, providing an increased pressure on distribution to continue reducing losses further.

In Serbia the level of distribution losses are considered by the regulatory agency to be reasonable compared to other countries in the region. Reductions in commercial losses are incentivised by assuming a non-collection rate of just 2%

Details of the actual levels and trends of distribution losses are provided in section 8.3.

6.7 Vulnerable Customers

It is recognised that increasing electricity prices will have a particularly hard impact on more vulnerable customers such as those on lower incomes, the disabled, pensioners, or those living in more remote areas. ECRB Best Practice Guidelines on the Protection of Vulnerable Household Customers advises that non-tariff protection is preferable to tariff-based protection for vulnerable customers because tariff protection distorts the working of efficient markets and in the longer term an efficient competitive market will deliver better prices for all.

The survey asked for details of whether protection was tariff or non-tariff based as well as details of customers to which such protection might be offered. In almost all cases the answer was that there was either no specific protection for vulnerable customers' electricity bills, or that any protection was provided through government or social institutions and was not tariff based.

A combination of tariff and non tariff based protection exists is Albania. There is no specific definition of energy vulnerable consumers, only the definition of vulnerable consumers used by the Ministry of Labour and Social Affairs. Although there are no specific timescales for Albania moving away from tariff based protection, an initiative exists under the jurisdiction of the Energy Community for this purpose.

While not specific to vulnerable customers, the relatively low level of residential tariffs compared to tariffs for other sectors identified in section 3.3 of this report offers some protection to vulnerable customer, but when tariffs are adjusted to be more cost reflective vulnerable customers along with other domestic customers will feel the impact.

7 INVESTMENT SELF SUFFICIENCY AND ALLOCATIVE EFFICIENCY

Allocative efficiency is about ensuring that the right goods or services are produced for the right customers at the right price. In an allocatively efficient market, the price of the good or service will reflect the costs of production; failure to ensure allocative efficiency will distort competition as markets are opened up because new entrants will only target sectors where the price is at or above economic costs and avoid sectors where price is below costs.

Similarly in an efficient competitive market new investments will only be made where the price of the goods or services being delivered is at or above the economic cost of providing those services.

It is therefore important in an efficient market that prices fully reflect costs in order to facilitate competition and ensure investment in the longer term.

The cost coverage analysis in section 1 suggests that although in principle the relevant components are now being taken into account in setting the level of prices across each sector, in practice certain elements of costs are being treated differently and there are examples where some costs (such as rate of return) are being included at below their full economic value in order reduce the impact of potential price rises on consumers.

In section 3.3 where we look at tariffs by consumer type it is also apparent that prices for different consumer types do not currently reflect the costs of serving those consumers. Revenues from residential consumers (in terms of cost per kWh supplied) are generally lower, sometimes significantly so, than those for commercial consumers even though there is no reason from a cost perspective why this should be so.

These shortcomings in cost coverage and allocation are generally acknowledged by the relevant regulators who are trying to balance meeting the needs of fully cost reflective tariffs with the desire not to impose sudden large price shocks on consumers, particularly residential consumers. It is expected to be a gradual process to adjust to cost reflective tariffs although this process should continue.

8 PRODUCTIVE EFFICIENCY

Productive efficiency examines the relationship between the quantity of outputs produced for a given quantity of inputs. Greater efficiency represents more outputs for the same level of inputs or the same outputs for fewer inputs.

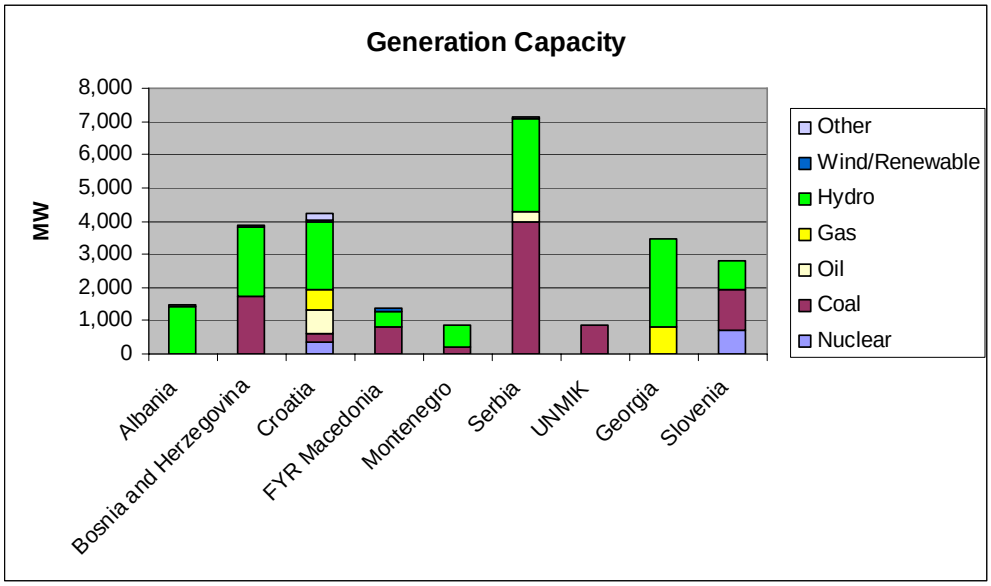
For each stage of the electricity supply chain, or for the chain as a whole, there may be a number of different output measures that one would consider when determining efficiency. The energy delivered to customers is clearly one of the key outputs in the electricity sector, but other outputs could relate to other factors such as reliability or capacity.

In terms of economic analysis inputs are usually considered in terms of units of labour, materials or goods consumed, and capital resources used within the organisation. Where, as is the case with this survey, it is not practical to go down to that level of detail, costs are a useful proxy for inputs and so the cost of delivering the output or service is a key indicator of efficiency.

Below we examine a number of different efficiency measures for each sector of the electricity supply chain. No one measure should be taken as a definitive comparator between the countries of this study since there may be particular reasons (geographical layout, population size, etc) why one country may be higher or lower on a particular measure than other countries. Instead each measure should be considered as an indicator of the relative position and consideration should be given to the reasons why differences might occur.

8.1 Generation Efficiency

The generation capacity for each country and split of different types of generation in 2007 is shown in the following chart:



It is clear that most countries in the region are heavily reliant on hydro power and/or coal for their generation capacity. Albania is almost totally dependent on hydro power for its own generation while UNMIK is almost totally dependent on

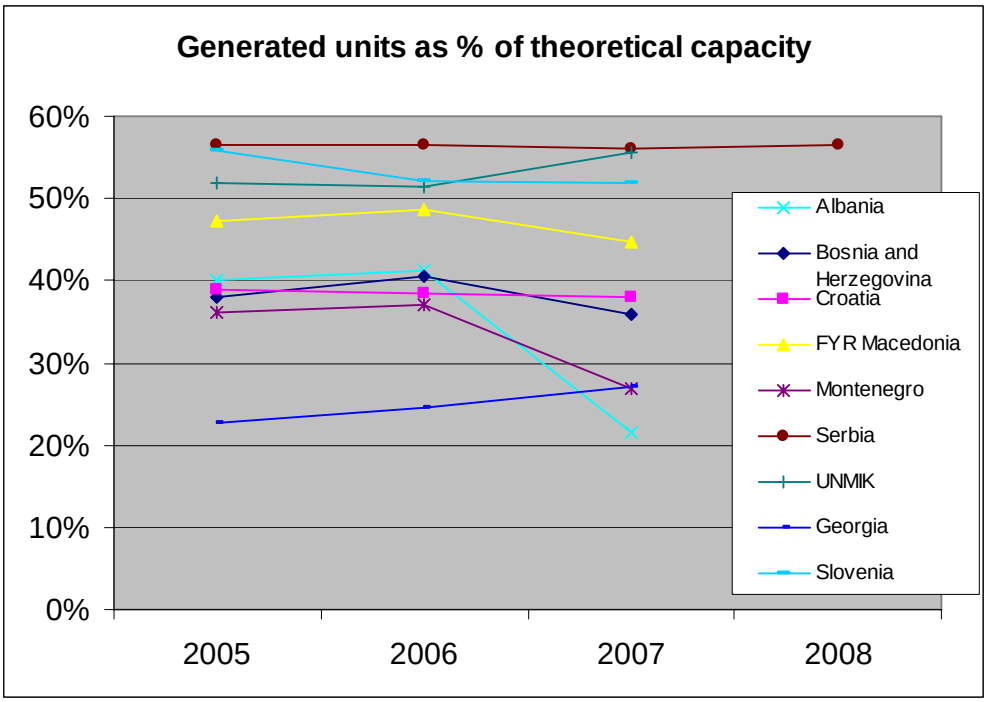
coal. Croatia has the most diverse mix of generation sources, but even in Croatia hydro power accounts for around half of the total generation capacity.

While there is no particular 'ideal' type of generation or mix of generation there are advantages and disadvantages to each of them:

- Hydro power has no fuel costs so is capable of producing relatively cheap electricity. It also has environmental benefits in that by not burning fossil fuels it is not contributing to CO2 outputs. However hydro power is dependent on rainfall levels and when, as occurred in 2007, rainfall levels are low this can lead to reductions in amounts generated.
- Coal power can be relatively efficient and where a country has its own coal resources represents a good way of using those resources. However if coal needs to be imported or transported long distances it can become more expensive as the costs of transporting such a bulky fuel are high. Coal also has high emissions.

In general it is better to have a diversified mix of generation types so that one is not overly dependent on any one type of generation and possibly forced into importing more expensive energy when problems occur with that fuel type.

One way of considering the productive efficiency of generation is to consider the amount of electricity that is actually generated as a percentage of the maximum that could have been produced using the equation (MWh produced)/(MW capacity * 8760). The results of this are shown below:



The results show that the countries with the higher levels of generated units relative to capacity are generally those that have more thermal (coal).

For countries with significant hydro generation (Albania, Bosnia and Herzegovina, FYR Macedonia and Montenegro) there was a significant drop in actual output

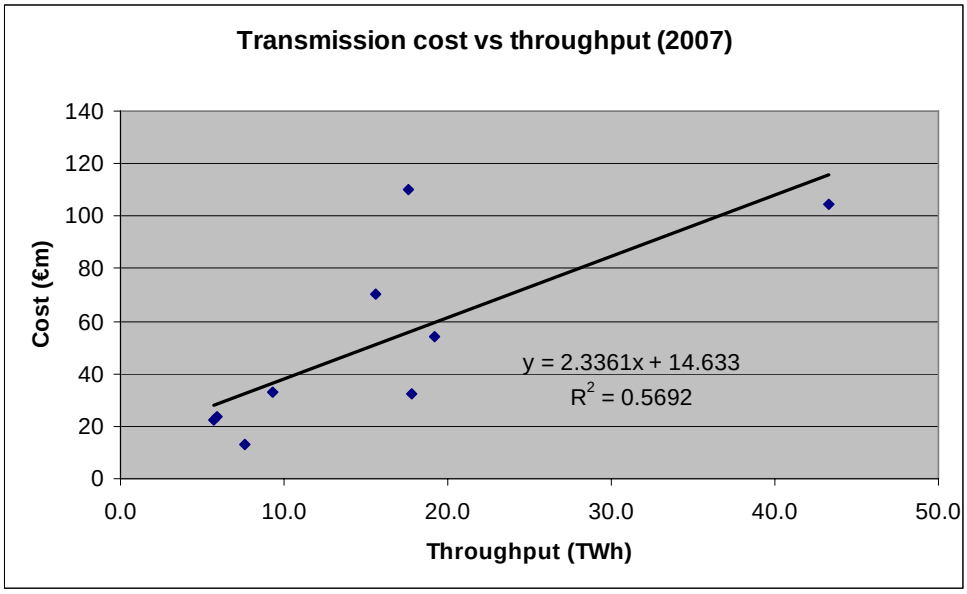
relative to capacity in 2007. This was due to a relatively dry year in the region affecting the output of those hydro plants.

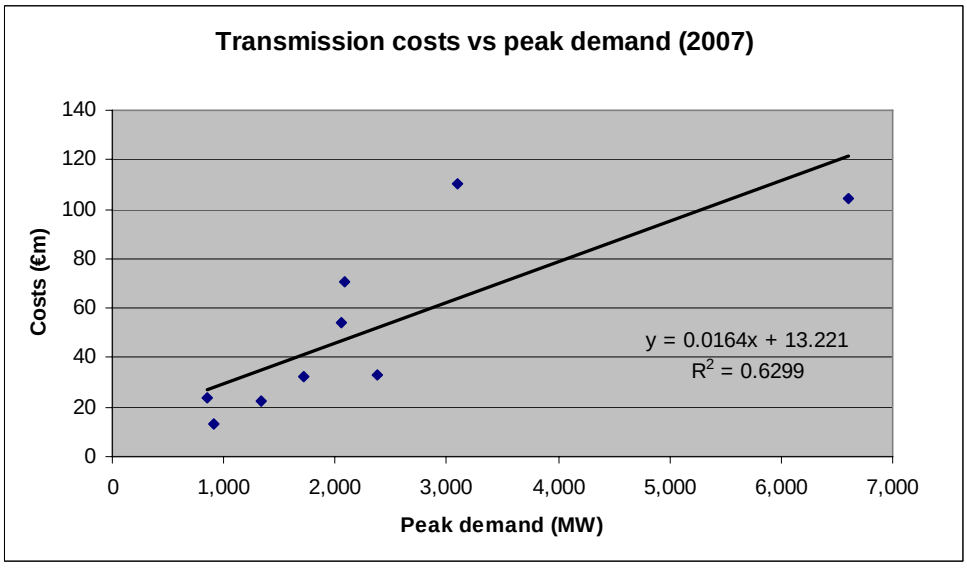
Georgia has the lowest levels of generated electricity relative to its capacity although it is the one country that has seen this ratio gradually increasing.

8.2 Transmission Efficiency

Transmission systems are usually considered in terms of the amount of energy they transport or the capacity they provide to enable the peak demand of electricity consumers to be met.

If one looks at the cost of transmission in relation to energy delivered (throughput) or cost in relation to peak demand satisfied as a possible indicator of efficiency one obtains the following results:





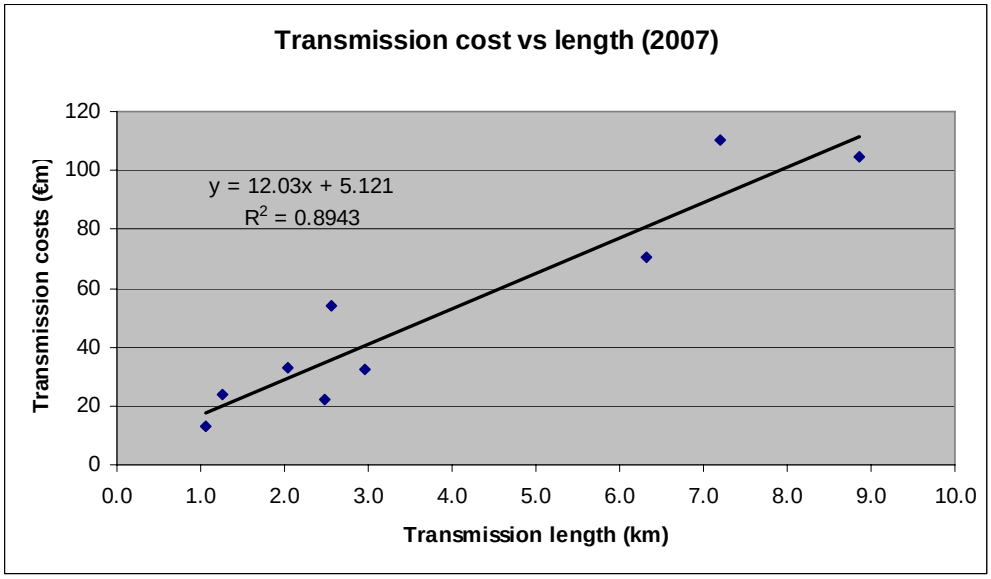
In both cases, while there is some relationship (as shown by the regression line) between either demand or throughput and the costs, there is a considerable degree of variation around this regression line with some instances of costs being considerably higher than expected (suggesting possible relative inefficiency) and others with costs clearly lower than expected (suggesting relative efficiency).

Croatia has the highest cost relative to either demand or throughput, with Bosnia and Herzegovina having the next highest cost relative to either throughput or demand.

Georgia and UNMIK have the lowest transmission costs relative to throughput on the system while Albania, FYR Macedonia, UNMIK and Georgia all have relatively low costs in relation to demand on their system.

Although both demand and throughput show some relationship with costs for transmission it is not a particularly strong relationship in either case. This may be either because there are actually large degrees of variation in transmission or because demand and throughput are not particularly good predictors of transmission costs.

Since the costs of a transmission network would be expected to bear some relationship to the size of the network, and the size of the network is often driven by other factors than throughput and maximum demand (eg a larger more dispersed country would require a larger transmission network, or if generation were located further from the main centres of demand) another measure that is often used to assess the efficiency of transmission businesses is the cost in relation to the overall size of the network in km. If one looks at the relationship between costs and length one obtains the following result:

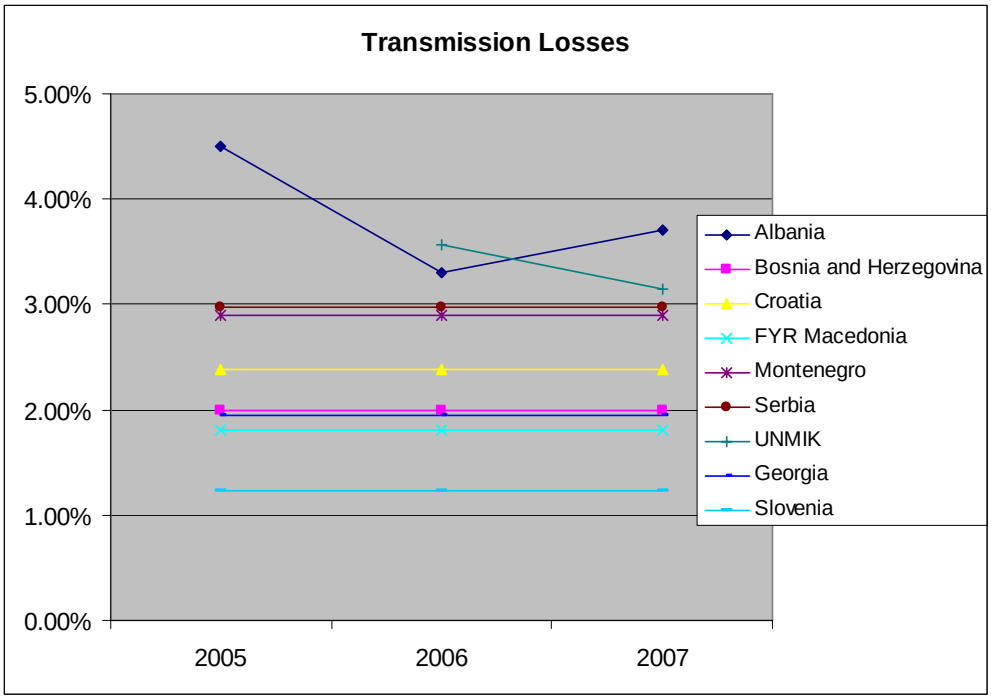


This time the regression is a much better fit to the data, as demonstrated by the higher r^2 factor but can also be seen by the relative proximity of the data points to the regression line. This suggests both that transmission length is a better predictor of costs (and thus a better basis for assessing relative efficiency) and also that the variation in efficiency is less than that suggested by comparing against demand or throughput.

Using this measure the highest costs relative to transmission length are Croatia and Slovenia while Albania is the lowest with Georgia, Bosnia and Herzegovina, Serbia and UNMIK also having relatively low costs.

Some caution is required in accepting the results of any cost based measure as an indication of efficiency since, as highlighted in section 6.3, there is still some degree of inconsistency in the way transmission costs are categorised between the different parties. Nevertheless the fact that it gives a reasonably good correlation on the regression suggests that there is some validity in the relationship.

Another measure of the efficiency of transmission is to consider the level of transmission losses in relation to the amount of energy supplied on to the network.



This chart shows transmission losses are either stable (suggesting an assumed rather than measured figure) or where there is variation from year to year there appears to be a downward trend.

Since most of the data provided does appear to be an assumed or derived level of losses rather than metered difference between energy supplied on to the system and that delivered from the system, it would not appear to be appropriate to comment further on the relative efficiencies suggested by this data without going further into detail about how the assumed figures are derived.

The data provided above suggests that the level of transmission losses in the region is not significantly different from other countries within Europe where transmission losses are typically in the range of 1.5% to 2.5%.

8.3 Efficiency of Transmission Tariff Structure

A further point for consideration of efficiency lies not in the efficiency of the transmission activity itself, but in the design of the tariffs to encourage efficient use of the system. This may for example include zonal pricing where on a large network or a network with generation and demand in different regions one wishes to encourage location on parts of the network that would be more efficient from a transmission perspective. Similarly there might be price signals to encourage use at times when available capacity on the transmission system is greater eg time-of-day tariffs.

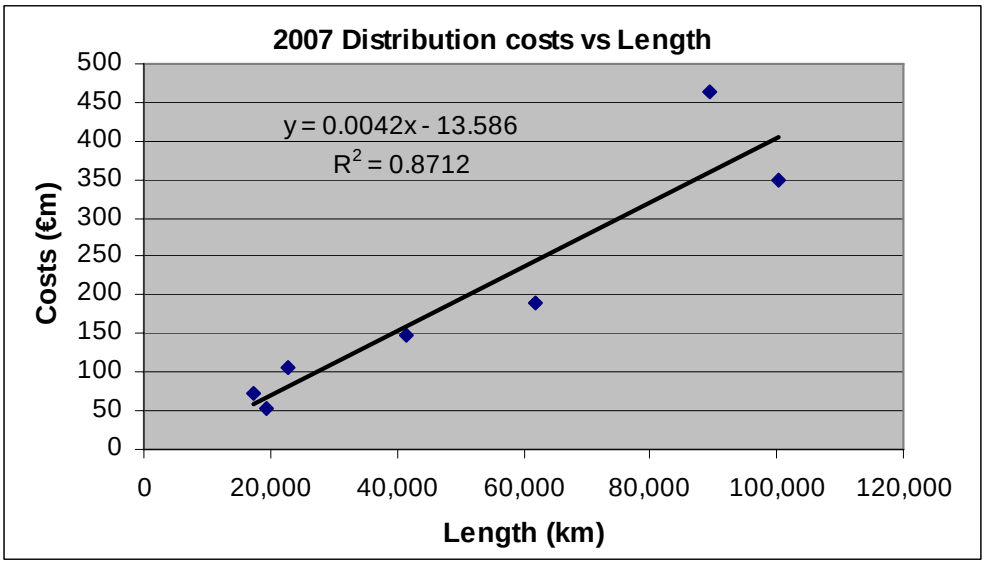
The table below summarises the extent to which these tariff signals occur:

	Share of Network Costs		Price Signals	
	Generator	**Load**	**Time of day/Seasonal**	**Locational**
Albania	0%	100%	✓	X
Bosnia and Herzegovina	0%	100%	X	X
Croatia	0%	100%	✓	X
FYR Macedonia	0%	100%	X	X
Montenegro	0%	100%	X	X
Serbia	0%	100%	✓	X
UNMIK	0%	100%	✓	X
Georgia			X	X
Slovenia	0%	100%	✓	X

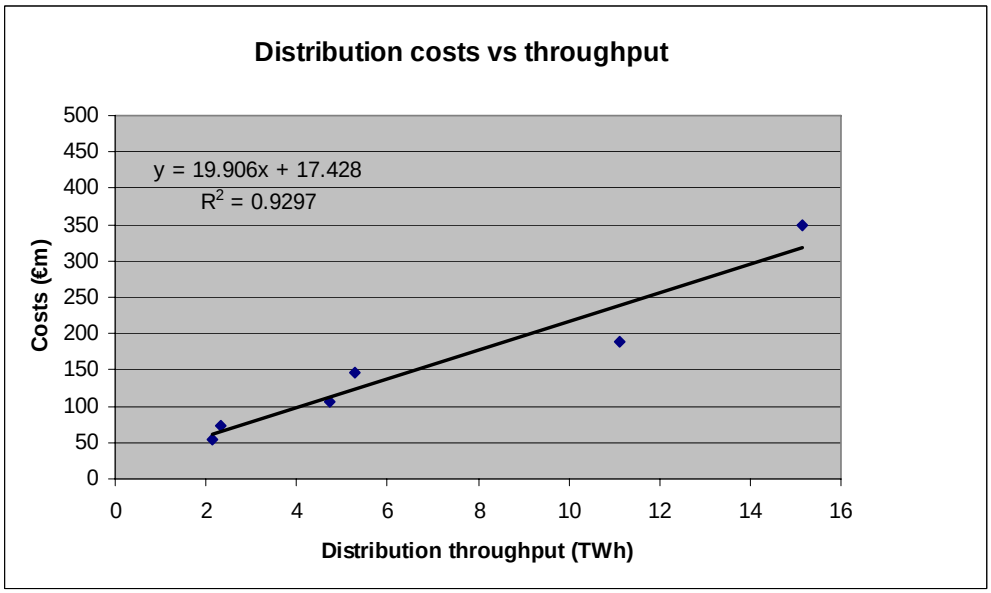
8.4 Distribution Efficiency

The measures one uses for consideration of distribution efficiency are similar to those that that are used for transmission efficiency.

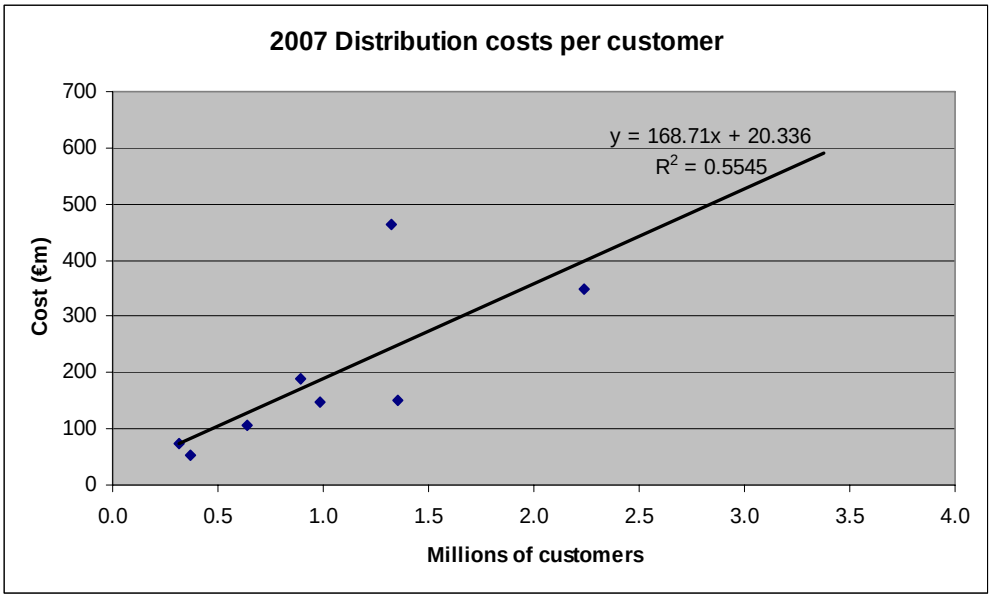
For distribution if we look at similar regressions based on network length and on throughput, while both give a good fit suggesting that both are closely related to the cost of distribution, this time the throughput regression gives a slightly better fit. The regression against throughput has one fewer data point (Georgia) as we did not have data for throughput on the Georgia distribution system.



Georgia has highest costs relative to length of network while Slovenia and Croatia have lowest. Others are a relatively close fit to the regression line



The furthest point from regression line is Slovenia which has slightly lower costs relative to its throughput. Albania and Croatia both have costs slightly higher than predicted by the regression against throughput with the other data points being more or less on the line. The relatively small number of data points available for this regression means the results should be taken with caution.

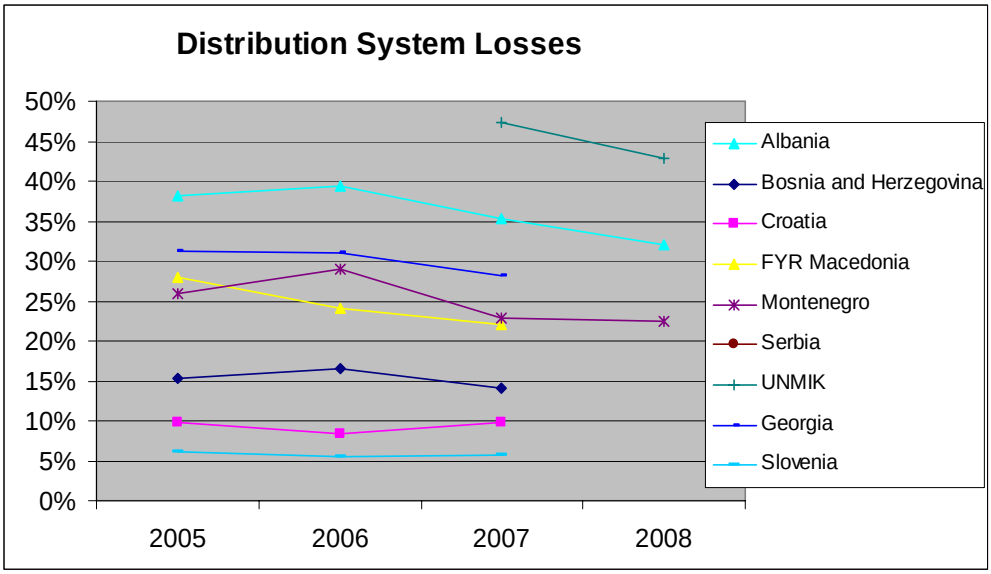


Looking at costs per customer appears to give a poorer relationship, however this is impacted significantly by the point lying well above the trend line (Georgia). If this point is excluded a similar line is produced with a better fit r^2=0.8977. As with looking at distribution costs and length this suggests for consumers in Georgia the distribution costs are relatively high. The cheapest cost per customer (point furthest below the line) is Bosnia and Herzegovina.

The fact that Georgia appears relatively high cost on the regressions against length and customer numbers may be at least partly explained by the different split between transmission and distribution in Georgia. For Georgia 110kV lines (except intersystem lines) are regarded as distribution, while for the other countries they are regarded as transmission.

As with the consideration of transmission costs against length and throughput, some degree of caution is required in using these results as there is a degree of inconsistency in the way in which distribution costs have been categorised by the different parties. Without a greater degree of consistency with costs like rate of return, depreciation, etc these results can only give an indication of relative efficiency, as part of the differences will be due to different cost allocations. However the relatively good correlation between costs and the appropriate measure used suggests that there is some validity in the comparisons.

In a similar manner to transmission, another measure of distribution efficiency is the level of losses on the system. Losses are of much greater significance on distribution networks than on transmission, both technical losses (due to the nature of the distribution networks and equipment used) and commercial losses (due to theft, inaccurate metering, etc).

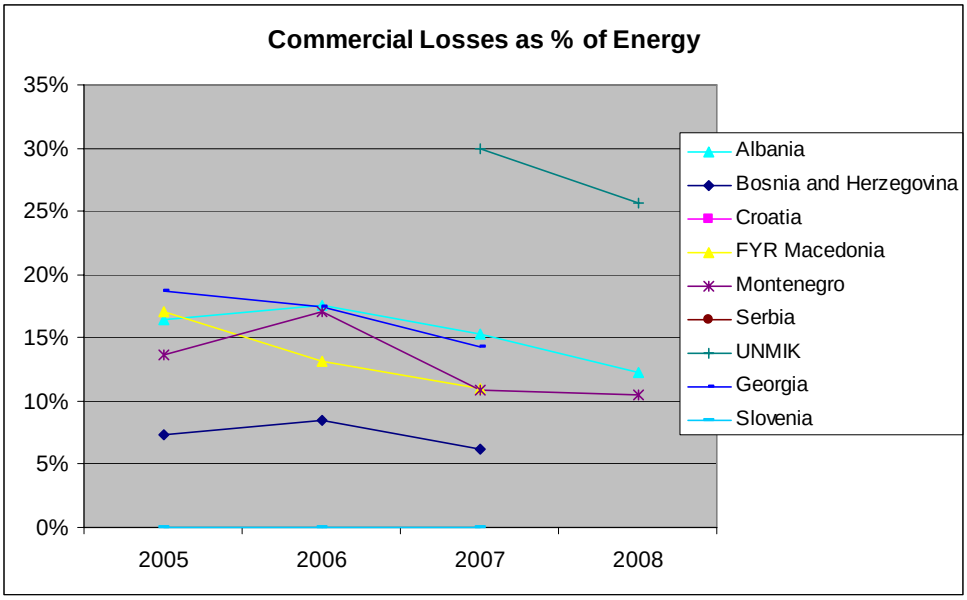


The level of distribution losses for most of the participants in this study is quite high and is particularly high in UNMIK, although each participant with the very high levels of losses is showing a downward trend.

Distribution losses for the countries with the lowest levels are relatively stable. Croatia has the lowest of the parties covered by this survey with losses around or just below 10%. For EU countries distribution losses are generally in the range of 5% to 10 % and data we received from Slovenia put their losses at just over 5%.

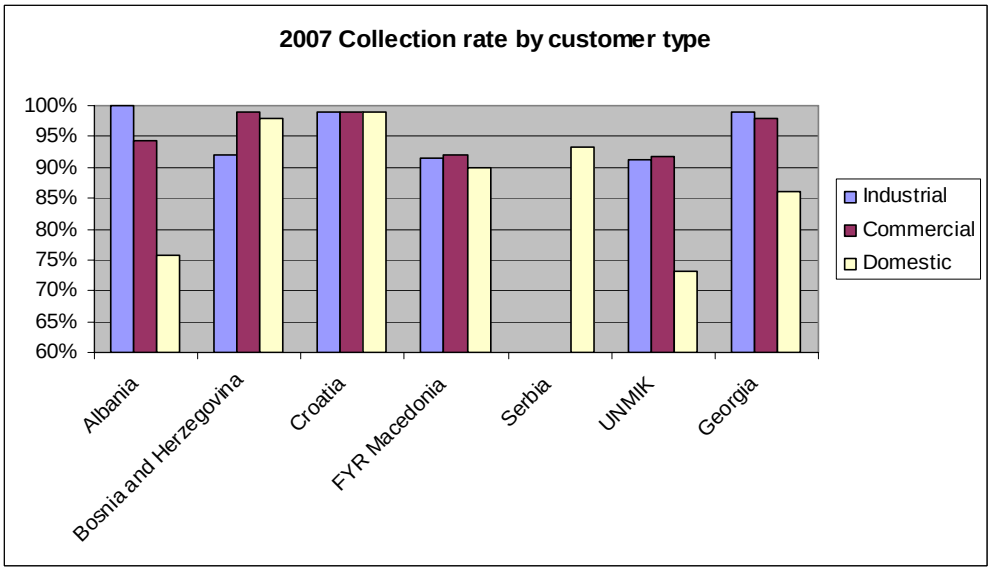
The following chart shows the main factor behind the high levels of distribution losses is the relatively high level of commercial losses. Although the levels of these commercial losses are quite high they are reducing as the incentives provided by the regulators by setting predetermined levels of losses for revenue determination purposes (in FYR Macedonia's case not allowing anything for commercial losses) forces the distributors to deal with the issue of losses or suffer financial losses as a consequence.

Even in countries where the level of distribution losses is not so high, the incentives are leading to a downward trend in these commercial losses.



8.5 Supply Efficiency

The supply activity remains integrated with distribution activity for each of the participants in this survey. That means that it is not possible to examine the efficiency of supply using measures one might use if it were a separate activity (eg supplier cost per customer supplied). However one measure is available that relates to supply activity and that is the collection rate ie the amount received as a percentage of the amount billed.

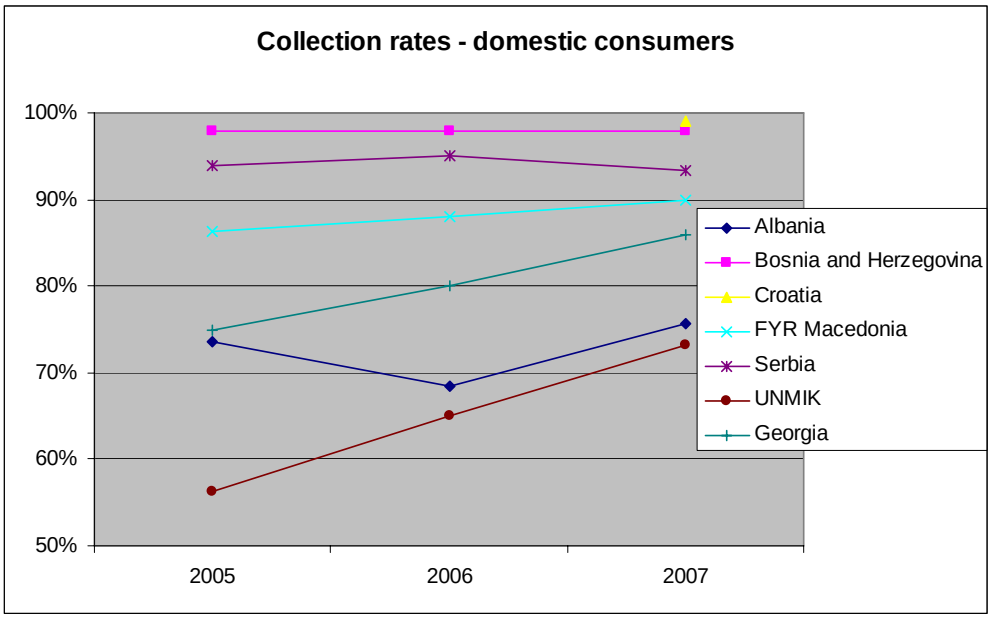


If one looks at collection rates in 2007 by customer type one can see a number of points. First, the collection rates vary from one country to another – Croatia has collection rates across each category approaching 100% while FYR Macedonia and UNMIK have collection rates at best around 90% meaning that around 10% of all energy billed in those two countries in 2007 was not actually paid for.

Secondly, collection rates for domestic customers are generally lower, and in the case of Albania and UNMIK were substantially lower at only around 70-75%.

Looking at the trend in collection rates for domestic consumers from 2005 to 2007 one can see that although collection rates were quite low in 2007, this generally represents an improvement from 2005 where, for historic reasons, collection rates were substantially lower.

Although there have been improvements in collection rates, this is an issue that needs to continue to be addressed as the culture and history of non-payment of electricity bills is yet another factor that will discourage new entrants in the competitive supply market.



9 CONCLUSIONS

9.1 Key Conclusions

This review has considered the tariff levels, design and composition in the seven Contracting Parties of the Energy Community and Georgia as an observer nation. The main conclusions are as follows:

- Although there are significant variations between the tariff levels of the different parties, overall tariff levels have been increasing in the period 2005 – 2007 towards more cost-reflective levels, and moving closer to each other.
- Much of the variation in overall tariff levels between the parties is driven by differences in generation costs and that this is largely related to the type of generation. The two predominant types of generation in the region are coal (higher tariffs) and hydro (lower tariffs)
- The relative levels of tariffs between different classes of customers has also been examined and it was noted that charges to residential consumers were generally lower than either industrial or commercial consumers although there do not appear to be any cost grounds to justify this. Nevertheless the regulators are generally aware of the issue and are gradually taking measures to address it.
- We have looked at the costs of each part of the supply chain and seen that although in principle, the methodologies for deriving regulated revenues are similar, there are a number of differences in the practical application, especially with the rate of return. In a number of cases, a gradual transition is in place so as to avoid price shocks.
- We looked at the efficiency of the different sectors of the supply chain using a number of different cost drivers and found no overall pattern of efficiency levels between the countries. Some of the differences observed may be down to how costs are allocated between activities (eg Georgia being relatively low cost on transmission activity but high on distribution activity). The differences in treatment of some cost categories (eg rate of return) will also account for some differences. A more detailed study would be required to account for the impact of these differences on the efficiency levels. Nevertheless the reasonably high levels of fit of cost data to the cost drivers suggests that variations in efficiency levels are not huge.
- One activity where there were most noticeable differences in efficiency was in the collection rate for electricity billed. Some countries have historically had very low collection rates and although these are improving they are still some way below other countries in the region.

9.2 Future Tariff Monitoring

We believe it is significant that the period covered by this review was one of considerable change and development for the countries involved; a process which is continuing. The stage of development of each jurisdiction and the period for which the regulators have been in place has inevitably been a major factor in this study. Whilst we have tried to recognise and contend with the different stages of

development in each country, it is difficult to make like-for-like comparisons while things remain fluid. For example in 2007, the last year of this review period, a number of countries were not including the cost of transmission losses in transmission tariffs but by 2008 most were. Also many regulators are aware of the relatively low levels at which the rate of return is being applied or of the differences in tariff levels between domestic and other types of consumers and are gradually correcting these issues to avoid sudden price shocks to consumers. Those with the least cost-reflective tariffs have furthest to go, but we believe it will be worth repeating this exercise as jurisdictions catch-up with each other.

Much of the data for this analysis has been relatively limited with a number of gaps. This is especially true for data in the earlier years. As better and more data is becoming available and more consistency with regulatory treatment for determining regulated revenues is occurring, repeating this review with the most recent information may be expected to give better insights as well as showing whether the observed trends have continued.

APPENDIX 1 - KEY POINTS BY JURISDICTION

Albania

- Retains some tariff based protection of vulnerable customers, although an initiative is underway to move from tariff based protection
- Has separate tariffs for government customers.
- From 2008 non – household customers are free to switch suppliers.
- Hydro generation accounts for almost all Albanian generation capacity, created energy shortages requiring increased imports in 2007 when water levels dropped.
- Has high levels of distribution losses, particularly commercial losses, which represented for the largest component of tariffs.

Bosnia and Herzegovina

- Although non-household customers are eligible to switch suppliers, competition in the retail market does not exist.
- Households will be able to switch suppliers from 2015.

Croatia

- Retail market became fully open to competition from 1st July 2008

FYR Macedonia

- Have separate tariffs for government customers.
- Regulator is currently reviewing tariff as it is aware that the difference in tariffs between residential and commercial consumers is not justified on cost grounds.
- The cost of debt used for distribution is less than the risk free rate reflecting the fact that substantial parts of the debt are loans from international organisations on preferential terms.
- No allowance is made for commercial losses when setting the approved level of technical losses

Montenegro

- Average commercial tariffs are particularly high relative to residential consumers due to inherited tariff differences. Tariffs are being adjusted over time to make more comparable.

- Support is provided to the aluminium industry through low tariffs
- Household will be able to switch suppliers from 1st January 2015

Serbia

- A 0% rate of return was applied to transmission
- Has the lowest average retail tariffs and has seen the highest increase in retail tariffs.
- Is currently in the process of determining distribution tariffs under its new methodology.

UNMIK

- The depreciation and rate of return is only applied to new investments since 2006
- Distribution losses account for the largest component of tariffs.
- Coal generation accounts for almost all of the generation capacity
- Domestic collection rate are low but rising.

Georgia

- Average tariffs are similar across all customer types.
- 110kV lines (except intersystem lines) are regarded as distribution; 110kV intersystem lines and any lines at higher voltages are regarded as transmission.
- Transmission losses represent a very small proportion of the transmission tariff.

APPENDIX 2 – DATA TABLES

The following tables contain summaries of the data used in the graphs of this report

Overall Level of End-user Prices

c/kWh	2005	2006	2007	2008
Albania	5.8	5.91	5.74	6.92
Bosnia and Herzegovina	5.4	5.64	5.84	
Croatia	7.12	7.33	7.33	
FYR Macedonia	4.52	4.66	5.06	
Montenegro	4.7	5.33	6.91	7.4
Serbia	3.39	3.88	4.24	5.61
UNMIK			5.13	5.34
Georgia	6.3	7.7	8.1	

End User Revenues by Supply Chain Component

€/MW	Generation	Transmission	Distribution/Supply
Albania (1)	9.6	6.2	41.0
Bosnia and Herzegovina	35.5	4.7	18.4
Croatia	38.9	8.1	25.5
FYR Macedonia	22.6	1.8	19.9
Montenegro	37.0	6.9	23.5
Serbia			
UNMIK	37.8	4.1	21.3
Georgia	19.4	4.5	28.0

Prices by Customer Type (2007)

c/kWh	Industrial	Commercial	Residential	Government
Albania	4.95	6.22	5.66	7.7
Bosnia and Herzegovina	4.59	8.9	5.77	
Croatia	5.64	7.86	7.77	
FYR Macedonia	5.19	7.91	4.16	8.18
Montenegro	6.99	17.58	6.58	
Serbia (1)	4.8303	7.2873	5.4087	
UNMIK	4.98	7.68	5.3	
Georgia	7.6	7.6	7.12	

Prices by Customer Type (2005)

c/kWh	Industrial	Commercial	Residential	Government
Albania	7.24	7.59	4.6	7.67
Bosnia and Herzegovina	3.86	9.44	5.52	
Croatia	5.58	7.6	7.62	
FYR Macedonia	4.66	7.37	3.72	7.65
Montenegro	6.93	15.48	4.68	
Serbia				
UNMIK				
Georgia	5.2	5.2	6.18	

Relationship Between Tariffs and Consumption

% change	2006	2007	2008
Albania		15.0%	
Bosnia & Herzegovina	4.4%	0.1%	
Croatia	5.5%	0.3%	
FYR Macedonia	3.3%	8.1%	
Montenegro			12.3%
Serbia			
Kosovo			-17.4%
Georgia	7.0%	-2.5%	

Changes in consumption levels	2006	2007	2008
Albania	-1.1%	-7.0%	
Bosnia & Herzegovina	-2.8%	3.0%	
Croatia	3.0%	-4.6%	
FYR Macedonia	-14.8%	24.0%	
Montenegro			
Serbia	-2.1%	-2.0%	
Kosovo	-1.0%	-17.3%	16.8%
Georgia	-14.5%	38.6%	

Note: shaded cells do not have both pairs of the data points and are not plotted.

Transmission Tariff Levels

	€m/TWH
Albania	3.881621
Bosnia and Herzegovina	4.52038
Croatia	6.251064
FYR Macedonia (1)	3.551334
Montenegro	4.042091
Serbia (1)	2.411422
UNMIK	1.733612
Georgia	1.826058
Slovenia	2.801601

Transmission Cost Coverage

(€m)	Return	Depreciation	Opex	Taxes	Losses	Other
Albania	7.70	3.86	9.70	0	0.00	0.97
Bosnia and Herzegovina	0.00	33.43	28.66	0	0.00	8.34
Croatia	7.60	29.80	46.80	0	26.00	0.00
FYR Macedonia (1)	5.32	4.19	7.86	0	7.02	8.50
Montenegro	0.00	5.60	10.92	0	7.51	-0.39
Serbia (1)	0.00	32.00	38.80	0	39.60	-5.90
UNMIK	0.23	0.60	8.74	0	4.55	-0.93
Georgia	5.19	4.02	15.90	3.4066	0.05	3.88

Distribution Tariff Levels

	€m/TWh
Albania	27.72353
Bosnia and Herzegovina	17.765
Croatia	23.01813
FYR Macedonia	22.22777
Montenegro	31.15523
Serbia	
UNMIK	25.08907
Georgia	
Slovenia	17.00045

Distribution Cost Coverage

€m	Return	Depreciation	opex	Taxes	Losses	Other
Albania	7.14	27.44	41.94	0	65.89	4.39
Bosnia and Herzegovina (1)	2.07	17.80	38.52	0	10.00	-11.23
Croatia	0.00	73.80	205.20	0	69.90	0.00
FYR Macedonia	15.98	12.41	51.28	0	20.49	0.66
Montenegro	0.00	16.05	41.09	0	21.15	-5.58
Serbia	0.00	0.00	0.00	0	0.00	0.00
UNMIK	1.15	0.59	15.77	0	37.06	-0.66
Georgia	27.80	18.40	311.30	44.1	37.70	23.90
Slovenia	0.00	0.00	0.00	0	0.00	0.00

Generation Efficiency

MW	Nuclear	Coal	Oil	Gas	Hydro	Wind/ Renewable	Other
Albania			12		1,427		23
Bosnia and Herzegovina		1,745			2,100	15	
Croatia	338	290	699	600	2,056	23	210
FYR Macedonia		795			502	56	
Montenegro		210			649	11	
Serbia		3,964	308		2,828		21
UNMIK		845			43		
Georgia				826	2,621		
Slovenia	696	1,241			886		

GWh generated per GW Capacity	**2005**	**2006**	**2007**	**2008**
Albania	40%	41%	22%	
Bosnia and Herzegovina	38%	41%	36%	
Croatia	39%	39%	38%	
FYR Macedonia	47%	49%	45%	
Montenegro	36%	37%	27%	
Serbia	57%	57%	56%	57%
UNMIK	52%	51%	56%	
Georgia	23%	25%	27%	
Slovenia	56%	52%	52%	

Transmission Losses

	2005	2006	2007
Albania	4.50%	3.30%	3.70%
Bosnia and Herzegovina	2.00%	2.00%	2.00%
Croatia	2.39%	2.39%	2.39%
FYR Macedonia	1.81%	1.81%	1.81%
Montenegro	2.90%	2.90%	2.90%
Serbia	2.97%	2.97%	2.97%
UNMIK		3.57%	3.15%
Georgia	1.94%	1.94%	1.94%
Slovenia	1.23%	1.23%	1.23%

Distribution Losses

Distribution Losses	**2005**	**2006**	**2007**	**2008**
Albania	38.10%	39.40%	35.40%	32.00%
Bosnia and Herzegovina	15.34%	16.44%	14.18%	
Croatia	9.85%	8.31%	9.83%	
FYR Macedonia	28.00%	24.16%	21.95%	
Montenegro	25.96%	29.06%	22.80%	22.50%
Serbia				
UNMIK			47.40%	42.80%
Georgia	31.20%	31.00%	28.20%	
Slovenia	6.09%	5.56%	5.74%	

Commercial Losses	**2005**	**2006**	**2007**	**2008**
Albania	16.40%	17.60%	15.30%	12.20%
Bosnia and Herzegovina	7.34%	8.44%	6.18%	
Croatia				
FYR Macedonia	17.00%	13.16%	10.95%	
Montenegro	13.60%	17.06%	10.81%	10.51%
Serbia				
UNMIK			30.00%	25.70%
Georgia	18.70%	17.50%	14.30%	
Slovenia	0	0	0	

Supply Efficiency

2007 Collection rate by customer type

	Industrial	Commercial	Domestic
Albania	100%	94%	76%
Bosnia and Herzegovina	92%	99%	98%
Croatia	99%	99%	99%
FYR Macedonia	91%	92%	90%
Serbia			93%
UNMIK	91%	92%	73%
Georgia	99%	98%	86%

Domestic Customer Collection Rates

	2005	**2006**	**2007**
Albania	73.60%	68.42%	75.62%
Bosnia and Herzegovina	98.00%	98.00%	98.00%
Croatia			99.00%
FYR Macedonia	86.34%	88.07%	89.83%
Serbia	94.00%	95.00%	93.30%
UNMIK	56.30%	65.07%	73.16%
Georgia	75.00%	80.00%	86.00%